



Department of “Natural sciences”.

MODULE HANDBOOK

BSc in WATER BIORESOURCES AND AQUACULTURE

MODULE HANDBOOK

Bachelor program in water bio-resources and aquaculture, 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	Full Time	
Language of Instruction	Azerbaijan, english	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
<p>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.</p> <p>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.</p>		
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		
Understanding the Historical Development of Azerbaijan Demonstrate an understanding of the early history of Azerbaijan, including the establishment of ancient civilizations like the Caucasian Albanians and their role in the region’s development. Examine the influence of key empires, such as the Persian, Ottoman, and Russian Empires, on Azerbaijan's political and cultural landscape. Exploring Azerbaijani Identity and Culture Analyze how Azerbaijan's national identity has evolved over time, with a particular focus on language, religion, and traditions. Evaluate the role of Azerbaijani literature, music, art, and architecture in shaping the country's cultural heritage. Political History and Independence Movements Discuss the political history of Azerbaijan, focusing on its time as part of various empires and its eventual independence in 1918, followed by Soviet incorporation in 1920. Explore the causes and impacts of Azerbaijan’s struggle for independence in the 20th century, particularly during the dissolution of the Soviet Union in 1991.		
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 language by 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	The ability to identify the 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		Azerbaijan in prehistory time	
2		Ancient states in azerbaijan. Manna, atropatena, ancient albania	
3		Azerbaijan in the iii-vii centuries	
4		Azerbaijan under the arab caliphate	
5		Azerbaijan in the 9th to the early 13 rd centuries	
6		Azerbaijan in the 14 th century to 15 th centuries	
7		Azerbaijan safavid state	
8		Khanates of azerbaijan	
9		Azerbaijan in the xix centuries	
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 ii and after the war	
14		Independent Azerbaijan Republic (1991- 2020s.)	
15		The second garabash war and the victory of azerbaijan	
<p>Recommended Sources TEXTBOOK(S)</p> <ul style="list-style-type: none"> - History of Azerbaijan (in 6 volumes). Baku: Elm, 2007–2013. Published by the Azerbaijan National Academy of Sciences; covers the main academic perspectives for each historical period. - Bunyadov, Z. M. (1988). Azerbaijan in the 7th–9th Centuries. Baku: Elm Publishing. An important study of medieval Azerbaijani history. - Ashurbeyli, S. (1997). The Shirvanshahs State. Baku: Azerneshr. About the feudal state formed in the Middle Ages and its culture. - Hasanli, J. (2009). The Azerbaijan Democratic Republic (1918–1920). Baku: Tahsil. 			

Covers the history, diplomacy, and domestic politics of the first independent Azerbaijani republic.			
- Altstadt, Audrey L. (1992). <i>The Azerbaijani Turks: Power and Identity under Russian Rule</i> . Hoover Institution Press.			
- Examines the situation of Azerbaijani Turks under the Russian Empire and Soviet rule.			
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 water bio-resources and aquaculture, Department of “Azerbaijani language and literature”.

Course Unit Title	Academic and business communication in Azerbaijani
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)

<p>"Scientific-Business Communication" – [Author: E.E.Eliyev / E.Q.Eliyeva] One of the foundational textbooks on academic and business communication in Azerbaijani. Covers official document writing, academic writing, scientific style, and oral communication.</p> <p>"Language of Official Correspondence" – [Author: Z.Jafarova] Focuses on the language and structure of formal and official writing in Azerbaijani. Includes templates and stylistic guidance for professional communication.</p> <p>"Professional Communication and Speech Culture" – [Author: Nergiz Memmedova] A practical guide to professional communication and speech culture. Used in higher education institutions for teaching public speaking and business interaction.</p> <p>"Azerbaijani Language and Speech Culture" – [Author: S.Hilize] While broader in scope, it includes chapters on scientific and business language use.</p>			
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 water bio-resources and aquaculture, 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	7	
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:		
<p>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.</p>		
Objectives of the Course: The aims of the course are:		
<ul style="list-style-type: none"> - 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.		
<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>		
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; Pronunciation; 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; Pronunciation; 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; Pronunciation;; 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; Pronunciation; 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; Pronunciation; 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; Pronunciation;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; Pronunciation; 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; Pronunciation; 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 water bio-resources and aquaculture, Department of “English Language Centre”.

Course Unit Title	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	8
Theoretical (hour/week)	-
Practice (hour/week)	4
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:	
<ul style="list-style-type: none"> - 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	

<p>others in all disciplines.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>			
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? Pronunciation: 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 understand 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? Pronunciation: 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? Pronunciation: 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 dictionary Grammar: Gerunds and infinitives as 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? Pronunciation: 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+prepositions	
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? Pronunciation: 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

Bachelor program in water bio-resources and aquaculture,Department of “Philosophy”.

Course Unit Title	Constitution of the Republic of Azerbaijan and fundamentals of law
Course Unit Code	ÜFS-B04
Type of Course Unit	Selection
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	Arzu Hajiyeva Behruz	
Name of Lecturer (s)	Arzu Hajiyeva Behruz	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	Azerbaijan	
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:		
Understand the Structure of the Constitution: Identify the key parts and chapters of the Constitution. Comprehend the roles and functions of each section, including the preamble, fundamental rights, and duties of citizens, and the structure of the government.		
Examine Fundamental Rights and Freedoms: Recognize and explain the civil, political, economic, and social rights guaranteed by the Constitution. Discuss the role of constitutional rights in protecting the individual against the state.		
Interpret the Principles of the Republic of Azerbaijan: Analyze the principles of sovereignty, democracy, legal equality, and the rule of law as outlined in the Constitution. Understand the state's commitment to secularism, respect for human rights, and the protection of national and cultural diversity.		
Understand the Separation of Powers: Demonstrate knowledge of how the Constitution organizes the legislative, executive, and judicial branches of government. Understand the system of checks and balances between these branches.		
At the end of the course the student will be able to		Assessment
1	To study in depth the Constitution of the Republic of Azerbaijan and to gain excellent knowledge about human and civil rights and freedoms.	
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		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 TEXTBOOK(S)			
The Constitution of the Republic of Azerbaijan			
Description: The official text of the Constitution is the primary document to study, as it outlines the principles, structure, and rights guaranteed in Azerbaijan's legal system.			
Where to find: Official Government Website			
Constitutional Law of Azerbaijan by Vugar Mammadov			
Description: A comprehensive study of Azerbaijan's constitutional law, including its development, the role of the Constitution, and its application in the legal system.			
Focus: Principles, structure of government, and the judiciary under the Constitution.			
Constitutional System of the Republic of Azerbaijan by Samira Mammadova			
Description: This book examines the constitutional structure of Azerbaijan, analyzing the legal relationships between the different branches of government, and provides insights into the legal principles enshrined in the Constitution.			
Constitutional Law of Azerbaijan: General Principles and Judicial Practice by Fikrat Mammadov			
Description: A detailed exploration of the general principles of constitutional law and judicial practice in Azerbaijan, with practical case studies.			
The Role of the Constitution in Modern Azerbaijani Statehood by Eldar Mammadov			
Description: This book looks at the historical and contemporary significance of the Constitution in the formation of the Azerbaijani state and its political system.			
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 water bio-resources and aquaculture, Department of “Philosophy”.

Course Unit Title	Ethics and aesthetics
Course Unit Code	ÜFS-B04
Type of Course Unit	Selection
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	Gunel Mustafayeva Nureddinovna
Name of Lecturer (s)	Gunel Mustafayeva Nureddinovna
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
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 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			
Understanding Ethical Theories: Students will be able to explain key ethical theories (e.g., utilitarianism, deontology, virtue ethics, care ethics) and apply them to real-world scenarios.			
Analyzing Ethical Dilemmas: Students will be able to critically analyze ethical dilemmas, identify key moral issues, and propose well-reasoned solutions based on ethical principles.			
Evaluating Moral Reasoning: Students will demonstrate the ability to evaluate and critique different moral arguments and recognize potential biases in ethical decision-making.			
Ethical Relativism vs. Objectivism: Students will understand and discuss the debate between ethical relativism and moral objectivism, and reflect on the implications for cross-cultural understanding.			
Ethical Responsibility and Society: Students will evaluate how ethical decisions impact individuals, groups, and society as a whole, considering both short- and long-term consequences.			
At the end of the course the student will be able to			Assessment
1	Forms the ability to rationally approach the history of ethical thought; modern approaches to the study of ethical knowledge create a complete picture of the essence of morality and classify its main functions		
2	Emphasizes the importance of maintaining objectivity in the study of the history of ethical thought		
3	Application of acquired theoretical knowledge in professional and daily 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 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		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 TEXTBOOK(S)

"Groundwork for the Metaphysics of Morals" by Immanuel Kant

A foundational text in moral philosophy, where Kant introduces the concept of the **categorical imperative**, a principle central to his deontological ethics.

"Utilitarianism" by John Stuart Mill

Mill defends the utilitarian approach to ethics, which evaluates actions based on their outcomes, specifically in terms of maximizing happiness.

"Nicomachean Ethics" by Aristotle

Aristotle's exploration of virtue ethics, focusing on the development of good character and moral virtues as a path to human flourishing.

"The Ethical Demand" by K.E. Løgstrup

A work that explores the ethics of intersubjectivity and responsibility, emphasizing the ethical demand that emerges in human relationships.

"The Genealogy of Morals" by Friedrich Nietzsche

Nietzsche critiques the development of Western moral philosophy, especially the concepts of guilt, responsibility, and the "slave morality" that he argues has shaped modern ethical systems.

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 water bio-resources and aquaculture, Department of “Information and technologies”.

Course Unit Title	Information technologies in the agrarian sector
Course Unit Code	ÜFS-B05
Type of Course Unit	Selection
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	p.ü.f.d., dos. Hacıyeva Rəna Cavadxan
Name of Lecturer (s)	p.ü.f.d., dos. Hacıyeva Rəna Cavadxan
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: To form appropriate knowledge, skills and habits in students, and to ensure their preparation for working with computers.	
Objectives of the Course: Ensuring the scientific and methodological preparation of future specialists (goals and content of Informatics training, forms of organization of training, methods and tools, modern training technologies), forming in them the relevant knowledge, skills and habits for implementing training, familiarizing them with the accumulated experience in teaching Informatics, and forming the ability to think logically.	
Learning Outcomes	

Understanding of Agricultural Technologies-Students will be able to describe key technologies used in modern agriculture, including sensors, drones, satellite imagery, geographic information systems (GIS), Internet of Things (IoT), and machine learning. Ability to explain how these technologies enhance farming practices such as precision farming, crop monitoring, and pest management.

Knowledge of Data Management in Agriculture-Demonstrate knowledge of agricultural data collection methods, including remote sensing, IoT-based devices, and data analytics tools. Understand how to store, manage, and analyze large datasets to make informed decisions regarding crop yield predictions, water usage, and soil health.

Application of IT Tools for Precision Agriculture- Students will be able to apply precision agriculture techniques using IT tools, such as GPS-enabled machinery, soil sensors, and automated irrigation systems, to optimize resource use and increase crop yields. Understand how to monitor and analyze environmental factors (such as temperature, humidity, and soil moisture) to create more efficient and sustainable farming systems.

Development of Smart Agriculture Solutions-Understand the concept of smart farming and how AI, machine learning, and robotics can contribute to automation, pest control, and harvesting. Learn how to design, implement, and manage smart agricultural systems using emerging technologies like drones, autonomous tractors, and AI-driven crop management software.

At the end of the course the student will be able to		Assessment
1	Formation of ideas about the goals and objectives of computer science as a science, scientific research methods, and its relationship with other sciences;	
2	Formation of ideas about the forms of organizing computer science training;	
3	Formation of ideas about the means of computer science training;	
4	Formation of ideas about the principles and teaching methods of computer science 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		Application of information technologies in the agricultural sector and the tasks they pose. Development stages of information technologies. Concept	

		of information, properties, forms, units of measurement.	
2		Computer architecture. Assembling and disassembling a computer. Visual familiarization with devices.	
3		The main components of information technologies. HardWare - technical support. SoftWare - software. BrainWare - instrumental support. Main and peripheral devices of computers.	
4		Practical ways to use the basic capabilities of the Word text editor. Formatting texts. Creating tables.	
5		Computer software. Classification of operating systems. Windows operating system, basic parameters. Files and folders. Types of menus and windows of the Windows operating system.	
6		Using the graphic capabilities of Word. Drawing diagrams.	
7		Word processors. Word text editor and its main capabilities. Graphic capabilities of Word text editor. Mathematical software packages.	
8		Windows operating system menus, windows. Windows Aero interface. Files and folders. Hot keys.	
9		Using and practicing the standard hotkeys of the Windows operating system	
10		Computer graphics. Color models. Basic capabilities of the Power Point presentation program. Application of the basic capabilities of the Power Point presentation program. Preparation of a presentation describing the life and work of famous people	
11		MS Excel spreadsheet. Cell, block, page. Creating charts. Filter and sort operations. Classification of functions in Excel. Mathematical, statistical, financial, text, logical and other category functions.	
12		Practical application of the basic capabilities of the MS Excel spreadsheet.	
13		Using database management systems in the agricultural sector. Purpose, main capabilities, objects, data types of Access DBMS	
14		Classification, architecture, types, topology of computer networks. Structure of the Internet network.	
15		Classification, architecture, types, topology of computer networks. Structure of the Internet network.	
<ul style="list-style-type: none"> - Recommended Sources TEXTBOOK(S) "Precision Agriculture for Sustainability and Environmental Protection" by K. S. Subramanian, C. S. P. Iyer, and B. R. S. Babu. Focuses on the application of precision agriculture, integrating the use of technologies like GPS, remote sensing, and data analytics for sustainable agricultural practices. - "Smart Agriculture: An Approach Towards Better Agriculture" by S. C. Gupta and S. S. Chikara. Explores the use of IoT, AI, and other digital tools to transform traditional agriculture into smart agriculture that enhances yield and sustainability. - "Information Technology for Management: Digital Strategies for Business" by Efraim Turban, Linda Volonino, and Gregory R. Wood. While not agriculture-specific, this book offers insights into information technology and management that can be applied to the agricultural sector, particularly in farm management information systems (FMIS). - "Digital Agriculture: Farmers in the Information Age" by John D. Kelly. A comprehensive exploration of how digital technologies, including sensors, machine learning, and AI, are shaping the future of farming and food production. - "Precision Agriculture Technology for Crop Farming" by Qin Zhang A detailed book focusing on the technologies involved in precision agriculture and their application to enhance crop production and reduce environmental impact. 			
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 water bio-resources and aquaculture, Department of “Philosophy”.

Course Unit Title	Introduction to multiculturalism
Course Unit Code	ÜFS-B04
Type of Course Unit	Selection
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	Elvin Xudaverdiyev Elshan oğlu
Name of Lecturer (s)	Elvin Xudaverdiyev Elshan oğlu
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
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		
Understanding the Concept of Multiculturalism		
Outcome: Students will be able to define multiculturalism and discuss its importance in a globalized world.		
Key Skills: Defining multiculturalism, distinguishing between cultural diversity, pluralism, and assimilation.		
Awareness of Cultural Diversity		
Outcome: Students will gain knowledge of the key characteristics of different cultures, including language, customs, religion, and social norms. Key Skills: Identifying cultural differences and similarities, describing key cultural traits and practices from various regions.		
Understanding Cultural Identity and Belonging		
Outcome: Students will explore how cultural identity is formed and how it impacts individuals' sense of belonging in both local and global contexts. Key Skills: Analyzing how culture shapes personal identity, understanding the role of race, ethnicity, and heritage in identity formation.		
Critical Analysis of Multicultural Policies		
Outcome: Students will critically analyze multicultural policies in various countries, evaluating their effectiveness and implications for society. Key Skills: Comparing different multicultural policies, analyzing their impact on social cohesion, inequality, and intercultural relations.		
At the end of the course the student will be able to		Assessment
1	The outcomes of the course Introduction to Multiculturalism include understanding of cultures, increased empathy and respect.	
2	To promote the development of tolerance, the enhancement of social knowledge, the strengthening of communication skills, integration and social harmony	
3	It also involves developing critical thinking skills.	
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 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	
<p>Recommended Sources TEXTBOOK(S)</p> <p>"Multiculturalism: A Critical Introduction" by Benhabib, Seyla A critical examination of the philosophical foundations and challenges of multiculturalism, addressing issues of citizenship, cultural diversity, and democracy.</p> <p>"The Multiculturalism of Fear" by William Kymlicka Kymlicka discusses the ethical and political dimensions of multiculturalism, offering a philosophical framework that advocates for a liberal approach to cultural diversity.</p> <p>"Multicultural Citizenship: A Liberal Theory of Minority Rights" by Will Kymlicka One of the seminal works on multiculturalism, this book argues for a liberal theory of minority rights, focusing on the balance between individual freedom and cultural group rights.</p> <p>"The Ethics of Immigration" by Joseph Carens This work examines multiculturalism within the context of immigration, exploring questions of justice, border control, and the moral obligations of liberal democracies.</p>			
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 water bio-resources and aquaculture, Department of “Philosophy”.

Course Unit Title	Logic
Course Unit Code	ÜFS-B05
Type of Course Unit	Selection
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	Gunel Mustafayeva Nureddinovna
Name of Lecturer (s)	Gunel Mustafayeva Nureddinovna
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
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; demonstrating an understanding of the central questions of logic as a field of philosophy, familiarity with the art of reasoning, and an understanding of the major challenges of the modern age.	
Learning Outcomes: Understanding of Logical Concepts Outcome: Students will be able to define and	

<p>explain key concepts in logic, such as propositions, premises, conclusions, validity, soundness, and truth. Key Skills: Defining terms, understanding the structure of arguments. Development of Argumentation Skills Outcome: Students will be able to construct, analyze, and evaluate arguments logically and critically. Key Skills: Identifying premises and conclusions, recognizing logical fallacies, and formulating coherent arguments. Propositional and Predicate Logic Outcome: Students will demonstrate proficiency in propositional and predicate logic, including the ability to symbolically represent statements and perform logical operations. Key Skills: Translating ordinary language into logical symbols, using truth tables, understanding quantifiers and variables.</p>			
At the end of the course the student will be able to		Assessment	
1	Studying the content of the subject's topics and problems, its main concepts, and their use in other philosophical and humanities disciplines.		
2	The student should be able to freely analyze and compare ideas found in philosophical schools.		
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 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 and the Language Theories of Ludwig Wittgenstein	
4		Logic and Classification Rules	
5		Statement. Syllogism, Conclusions. Analysis of Arguments	
6		Formal and Informal Logic	
7		Logical errors, ability to ask the right questions	
8		Inductive and Deductive Logic	
Recommended Sources TEXTBOOK(S)			
"Introduction to Logic" by Irving M. Copi, Carl Cohen, and Kenneth McMahon			
A comprehensive introductory text that covers classical logic, informal logic, and logical fallacies. It's widely used in philosophy and introductory logic courses.			
"Logic: A Very Short Introduction" by Graham Priest			
A concise, accessible introduction to the field of logic, ideal for readers without a technical background.			
"An Introduction to Non-Classical Logic: From If to Is" by Graham Priest			

<p>This book introduces a variety of non-classical logics, including intuitionistic, modal, and relevance logic. "The Logic Book" by Merrie Bergmann, James Moor, and Jack Nelson A standard textbook that focuses on formal logic, covering both propositional and predicate logic, with exercises and proofs. "A Concise Introduction to Logic" by Patrick J. Hurley An accessible and popular text for beginners, focusing on both formal and informal reasoning, with real-world applications and exercises.</p>			
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 water bio-resources and aquaculture, Department of "Philosophy".

Course Unit Title	Philosophy
Course Unit Code	ÜFS-B04
Type of Course Unit	Selection
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	Gunel Mustafayeva Nureddinovna
Name of Lecturer (s)	Gunel Mustafayeva Nureddinovna
Name of Assistant (s)	-
Mode of Delivery	-
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	
<p>Critical Thinking and Reasoning Skills:The ability to analyze and evaluate arguments and philosophical positions. Developing the ability to identify logical fallacies and weaknesses in reasoning. Constructing coherent, well-supported arguments and responding to counterarguments effectively.</p> <p>Understanding Key Philosophical Concepts and Theories: Gaining familiarity with major philosophical figures (e.g., Plato, Kant, Nietzsche) and their contributions. Understanding core philosophical concepts such as ethics, metaphysics, epistemology, logic, and political philosophy. Exploring different schools of thought (e.g., utilitarianism, existentialism, empiricism) and understanding their impact on society and thought.</p> <p>Clear and Effective Communication: The ability to present complex philosophical ideas clearly, both in written and oral forms. Developing a strong ability to articulate and defend philosophical arguments. Engaging in discussions and debates with respect, clarity, and depth.</p> <p>Interpreting and Analyzing Philosophical Texts: Developing the ability to interpret and critically read complex philosophical works. Identifying and analyzing key arguments and assumptions in philosophical texts. Engaging with primary texts and secondary interpretations to develop a deeper understanding of philosophical problems.</p>	
At the end of the course the student will be able to	
	Assessment
1	Modern approaches to the study of natural and social phenomena
2	Ability to collect and analyze empirical data
3	To form the rules for compiling a scientific paper, the ability to summarize and analyze the results of 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 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 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 TEXTBOOK(S)

R.Mehdiyev. Fəlsəfə. Ali məktəblər üçün dərs vəsaiti, Bakı, 2010.

Fəlsəfə (red. F.Ramazanov), Bakı, 2001

S.Xəlilov. Fəlsəfə: tarix və müasirlik. Bakı, 2006

S.Xəlilov. İslam dünyasında milli fəlsəfi fikir və onun tədrisi metodları. Bakı, 2008

Ə.Tağıyev. Qloballaşma və millilik fəlsəfi-siyasi reallıqlar kontekstində. Bakı, 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			90
Total Workload/30(h)			90\30
ECTS Credit of the Course			3

MODULE HANDBOOK

Bachelor program in water bio-resources and aquaculture, Department of “Political science, Psychology and social work”.

Course Unit Title	Political science
Course Unit Code	ÜFS-B05
Type of Course Unit	Selection
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
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	Rehimov Elkhan Rehim
Name of Lecturer (s)	Rehimov Elkhan Rehim
Name of Assistant (s)	-

Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
<p>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.</p>	
<p>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</p>	
<p>Learning Outcomes Understand core concepts of political science, such as power, sovereignty, governance, democracy, justice, and political ideologies. Explain major theories and approaches in political science, including realism, liberalism, Marxism, institutionalism, and constructivism. Identify political systems (e.g., democracy, authoritarianism) and analyze their structures and functions. Understand international relations and global political issues such as diplomacy, conflict, cooperation, and globalization. Demonstrate knowledge of constitutional and legal systems, public administration, and political institutions.</p>	
At the end of the course the student will be able to	
1	A successful student will have fully mastered the key political concepts by the end of the course.
2	The ability to analyze empirical and normative approaches will be developed.
3	Familiarity with various political teachings will help them develop 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 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		Knowledge about politics Stages of development of political sciencei	
2		The Concept of the State Definition of the State Social Contract The Role and Power of the Stateü	
3		Political ideologies Political power	
4		Democracy The concept of democracy Forms of democracy1	
5		Foreign policy The concept of foreign policy Functions of foreign policy	
6		Foreign policy The concept of foreign policy Functions of foreign policyr	
7		Global Governance What is Globalization? What is Global Governance? Global Media and the Public Dilemma	
8		Game Theory Political Conflict and Security	
<ul style="list-style-type: none"> - Recommended Sources TEXTBOOK(S) - Steven Levitsky & Daniel Ziblatt – <i>How Democracies Die</i> - Daron Acemoglu & James A. Robinson – <i>Why Nations Fail</i> - Alexis de Tocqueville – <i>Democracy in America</i> - Robert Putnam – <i>Bowling Alone</i> - The Federalist Papers – Hamilton, Madison, Jay - Theda Skocpol – <i>Protecting Soldiers and Mothers</i> 			
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 water bio-resources and aquaculture, Department of “Psychology and social work”.

Course Unit Title	Sociology
Course Unit Code	ÜFS-B04
Type of Course Unit	Selection
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	Qasimov Azer
Name of Lecturer (s)	Qasimov Azer
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: The main objective of this subject is to provide students with fundamental knowledge about the structure of society, social institutions, social change, 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 provide students with social	

theories, empirical research methods, and concepts essential for investigating the impact of social structure 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:

In addition to developing critical and analytical thinking skills, sociology provides students with the theoretical and practical knowledge necessary to work in various areas of society - social policy, social services, business, media and non-governmental organizations. During the course, students will analyze social problems, become familiar with empirical research methods and develop skills that can contribute to the social development of society.

Learning Outcomes

Understanding Sociological Concepts: Students will be able to define and explain core sociological concepts such as social structure, culture, norms, roles, socialization, stratification, and deviance. Students will recognize the impact of social institutions (e.g., family, education, government, religion) on individual behavior and society.

Sociological Theories: Students will demonstrate familiarity with major sociological theories, including structural functionalism, conflict theory, symbolic interactionism, and feminist theory. Students will be able to critically compare and contrast the different theoretical frameworks used to understand social phenomena.

Research Methods: Students will be able to describe and apply basic sociological research methods, including surveys, ethnography, experiments, and content analysis. Students will be able to critically assess the strengths and weaknesses of different research methods and understand ethical issues in sociological research.

Critical Thinking and Analysis: Students will be able to apply sociological perspectives to analyze social issues, inequalities, and problems, such as race, class, gender, sexuality, and globalization. Students will develop the ability to critically evaluate social policies, practices, and structures.

At the end of the course the student will be able to		Assessment
1	They will be able to explain the basic concepts, theoretical directions, and research methods of sociology.	
2	They will analyze the functions of social institutions (family, education, religion, economy, politics) and their impact on society.	
3	They will be able to explain the processes of social stratification, social mobility, and social change.	
4	They will understand the causes and consequences of social problems (gender inequality, poverty, ethnic and racial relations, crime, etc.).	
5	They will learn about globalization, urbanization, and modern social trends.	
6	They will analyze the relationships between social groups and individuals and evaluate the functioning of social institutions.	
7	They will be able to apply the theoretical knowledge they have gained in social policy, business, media, and other fields.	
8	They will approach social problems critically and develop analytical thinking skills to solve 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 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		Sociology as a science	
2		Society as a complex social phenomenon	
3		Personality as a social system	
4		Concept of social structure	
5		Sociology of social ethnic relations	
6		Social territorial associations	
7		Religion and sociology	
8		Education and sociology	

- Recommended Sources TEXTBOOK(S)
- "The Communist Manifesto" by Karl Marx and Friedrich Engels (1848)
- "The Division of Labor in Society" by Émile Durkheim (1893)
- "The Sociological Imagination" by C. Wright Mills (1959)
- "Suicide" by Émile Durkheim (1897)
- "The Presentation of Self in Everyday Life" by Erving Goffman (1959)

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 water bio-resources and aquaculture, Department of “Philosophy”.

Course Unit Title	Entrepreneurship basics and introduction to business
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)	1
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	ALBERTO LEVY
Name of Lecturer (s)	ALBERTO LEVY
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
<p>This course will provide students with the key foundations of the entrepreneurial process from a macro and micro perspective. The course will be based on three main pillars: 1) creativity, 2) logical reasoning and 3) problem sensitivity. These three skills are at the core of any entrepreneur’s thinking that takes place amidst the contextual reality of today’s extreme uncertainty. These skills will also be particularly relevant for future employment and businesses, as organisations increasingly need to be agile and take an experimental approach to build valuable innovations and business models that positively affect society and meet the needs of the market.</p>	
Objectives of the Course:	
<p>All subject-related articles and additional learning materials will be distributed to students via email communication throughout the semester. These resources are essential for a comprehensive grasp of the topics and concepts covered throughout the “Introduction to Entrepreneurship” course. It is imperative that students engage with these materials diligently, as they play a pivotal role in enhancing their understanding and academic success in the course.</p>	
Learning Outcomes	

Objective: 1: Understand the entrepreneurial process, its impact, and significance within the macro and micro context of individuals, economies and societies.
 Objective 2: .Understand and apply the entrepreneurial mindset to discover business ideas and assess their viability
 Objective 3: Analyse the key components of the entrepreneurial process, namely; opportunity discovery, business modelling, procurement resources and team formation.
 Objective 4: Apply your analysis of the entrepreneurial process to an idea you identify as a team early in the course.

At the end of the course the student will be able to		Assessment
1	Objective 1: Develop expertise in techniques and frameworks for assessing business	
2	Objective 2: Encourage students to consider entrepreneurship as a potential future career path.	
3	Objective 3: Equip students with the knowledge of utilising technology to discover resources, conduct research, and promote your business.	
4	Objective 4: Provide students with an opportunity to develop effective managerial skills, including: - written communications skills (i.e. memos, proposals, reports). - presentation skills (i.e. presentations, discussions, interviews). - teamwork skills (i.e., team member, team leader).	

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 Entrepreneurship	
2		Entrepreneurial & Start Up Culture	
3		Startup Thinking	
4		Problem Definition	
5		Empathy And Observation	
6		Innovation And Creativity	
7		Ideation	
8		Group Project 1: Startup Concept	

Recommended Sources TEXTBOOK(S)

All subject-related articles and additional learning materials will be distributed to students via

email communication throughout the semester. These resources are essential for a comprehensive grasp of the topics and concepts covered throughout the “Introduction to Entrepreneurship” course. It is imperative that students engage with these materials diligently, as they play a pivotal role in enhancing their understanding and academic success in the course.

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 water bio-resources and aquaculture, Department of “Information technologies”.

Course Unit Title	Information technologies
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		
Name of Lecturer (s)	PhD Ahmadova Esmira	
Name of Assistant (s)	PhD Ahmadova Esmira	
Mode of Delivery	Full time	
Language of Instruction	Azerbaijan	
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. 1. Ability to interpret the knowledge gained about information and communication technologies, their application in various fields, information management, database creation, etc.; 2. Ability to use information technologies.		
At the end of the course the student will be able to		Assessment
1	- Formation of ideas about information processes;	
2	- Formation of ideas about information technologies and their application areas;	
3	- Formation of ideas about information management;	
4	- Formation of ideas about database management systems and database creation;	
5	- Formation of ideas about spreadsheet organization technologies;	
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
1		Information and information processes. Information management.
		Exam

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 application programs.	
Recommended Sources			
1 Naciyeva R.C. İnformatika. Mühazirələr toplusu, QKU-nun Poliqr.və Nəşr.mərkəzi, Bakı, 2020,180 səh.Трофимов В. В. Информатика. Учебник для академического бакалавриата. В 2-х томах. Том 2. М.: Юрайт, 2019. 406 с.			
Филимонова Е. В. Информатика и информационные технологии в профессиональной деятельности. Учебник. М.: Юстиция, 2019. 216 с.			
Kərimov S.Q., Nəbibullayev S.B., İbrahimzadə T.İ. İnformatika. Bakı, 2011.			
Каймин В.А. Информатика. - М.: ИНФРА-М, 2012.			
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 water bio-resources and aquaculture, Department of “Natural sciences”.**

Course Unit Title	General chemistry	
Course Unit Code	IF-B01	
Type of Course Unit	Campulsory	
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 Naila Guliyeva	
Name of Lecturer (s)	PhD Naila Guliyeva	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
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.		
Learning Outcomes		
<i>Atomic and Molecular Structure</i>		
Describe atomic structure using modern quantum theory (orbitals, electron configurations). Explain periodic trends (atomic radius, ionization energy, electronegativity). Predict bonding behavior using Lewis structures, VSEPR, hybridization, and molecular orbital theory.		
<i>Chemical Bonding and Interactions</i>		
Distinguish between ionic, covalent, and metallic bonds. Explain intermolecular forces (dipole-dipole, hydrogen bonding, London dispersion) and how they affect physical properties. Apply bond polarity and electronegativity to predict molecular properties.		
<i>Stoichiometry and Chemical Reactions</i>		
Balance chemical equations and use them to calculate masses, moles, volumes, and concentrations. Identify types of chemical reactions (acid-base, redox, precipitation). Perform limiting reagent and percent yield calculations.		
At the end of the course the student will be able to		Assessment
1	Formation of ideas about the goals and objectives of chemistry, scientific research methods, and its relationship with other sciences;	
2	Formation of ideas about chemical experiments;	
3	Formation of ideas about the means of training;	

	Formation of ideas about pedagogical principles and teaching methods;		
4	Formation of students' perceptions about the goals and objectives of their education;		
5	Formation of students' perceptions about the content of the chemistry course.		
6	Formation of ideas about the goals and objectives of chemistry, scientific research methods, and its relationship with other sciences;		
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. Basic quantitative (stoichiometric) laws of chemistry	
2		Models of atomic structure. Periodic law and periodic system of elements.	
3		Characterization of chemical bonds. 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		Hydrocarbon derivatives	
13		Organic polymer materials.	
14		Elements of chemical analysis.	
15		Chemistry and ecology.	
16		Lab1: Electrolyte solutions and conductivity	
17		Lab 2: Synthesis and study of properties of complex compounds	
18		Lab 3: Combustion of organic matter and energy release	
Recommended Sources TEXTBOOK(S)			
"Chemistry: The Central Science" – Brown, LeMay, Bursten, Murphy, Woodward, Stoltzfus			
"General Chemistry: Principles and Modern Applications" – Petrucci, Herring, Madura, Bissonnette			
"Chemistry" – Zumdahl & Zumdahl			

"Principles of Modern Chemistry" – Oxtoby, Gillis, Campion			
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 water bio-resources and aquaculture, Department of “Mechanics and mathematics”.

Course Unit Title	Physics
Course Unit Code	IF-B03
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	Salimov İlham Nasir	
Name of Lecturer (s)	Salimov İlham Nasir	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description: To form the relevant knowledge, skills and habits in students, to ensure their ability to conduct physical experiments, analyze the results and analyze the data obtained		
Objectives of the Course: To instill in students the laws of electromagnetism, optics, atomic and nuclear physics. To introduce students to visual aids and do practical work throughout the course. To learn the connection of physics to life and to be able to apply it to various fields.		
Learning Outcomes Classical Mechanics: Understand Newton's Laws of Motion, concepts of force, work, energy, power, and momentum. Electromagnetism: Understand electric fields, magnetic fields, electric circuits, and the fundamental laws of electromagnetism such as Coulomb's Law, Gauss's Law, and Faraday's Law. Thermodynamics: Understand the laws of thermodynamics, concepts like heat, temperature, entropy, and energy conservation. Waves and Optics: Understand wave properties, the nature of light, sound waves, interference, diffraction, and the principles of lenses and mirrors. Modern Physics: Understand basic concepts of quantum mechanics, relativity, atomic structure, and nuclear physics.		
At the end of the course the student will be able to		Assessment
1	Lectures are the main form of delivery of course material.	
2	An important aspect of physics lectures is conducting physical experiments in real and computer environments.	
3	Educational films and model computer programs should be used Important sections of the course program can be taken out for seminar classes	
4	Seminars cover theoretical materials that require complex mathematical tools.	
5	Various problem-solving methods are studied in seminars	
6	Students may receive various types of homework to reinforce seminar materials.	
7	By performing laboratory work, students will gain practical understanding of the subject.	
8	Lectures are the main form of delivery of course material.	
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		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		Elastic forces. Hooke's law. Mechanical stress. Friction force, types, friction coefficient. Mechanical work. Power, units of measurement. Impulse. Energy. Kinetic and potential energy. Law of conservation of mechanical energy. Law of conservation of momentum.	
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 movement. Mathematical and spring dancers. Period of dance. Harmonic dances. Equations of harmonic dance. Mechanical waves and their types. Wavelength. Interference of waves.	
5		Steady flow of fluids. Continuity equation. Bernoulli's equation and its consequences. Viscosity of liquids and gases. Flow of liquids in pipes. Poiseuille's formula.	
6		Laminar and turbulent flow regime. Reynolds number. Motion of a solid in a liquid and gas. 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 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		Steady electric current. Conditions for the occurrence 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		The movement of charged particles in a magnetic field. Lorentz force. Magnetic flux. The phenomenon of electromagnetic induction. Induction current. The phenomenon of self-induction, inductance. Lenz's rule.	
13		Alternating current. Ohm's law for alternating current circuits. Transformers, operating principle. Distribution and transmission of electrical energy over long distances.	
14		Elements of geometric optics. Thin lens, Lens formula. Optical power of the lens Diopter. Linear magnification of the lens. Wave properties of light. Interference of light. Coherence.	
15		Structure of the atom. Thomson model of the atom. Rutherford experiment. Planetary model of the atom. Bohr theory. Bohr postulates, its shortcomings. Stationary states.	
16		Lab 1: Verification of Newton's Second Law of Motion	
17		Lab 2: Investigation of Ohm's Law and Electric Circuit Components	
18		Lab 3: Investigation of Mechanical Oscillations with a Spring-Mass System	

Recommended Sources TEXTBOOK(S)
"Principia Mathematica" by Isaac Newton (1687)
"The Feynman Lectures on Physics" by Richard P. Feynman (1964)
"Classical Mechanics" by Herbert Goldstein (1950)

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 water bio-resources and aquaculture, Department of "Natural sciences".

Course Unit Title	Botanic
Course Unit Code	İF-B04
Type of Course Unit	Campulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	7
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	Abdullayeva Reyhan Kamil
Name of Lecturer (s)	Abdullayeva Reyhan Kamil
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The course "Botany" teaches the biological regularities of the plant world, diagnostic signs in the morphological and anatomical structures of the vegetative and generative organs of plants. The teaching

process should be carried out in the form of a combination of lectures and experimental-laboratory exercises. Theoretical knowledge on individual topics obtained in lectures should be reinforced by the skills acquired by the student during independent work in laboratory exercises.			
Objectives of the Course: 1. Providing information about the internal and external structure of plants, their individual development; 2. Educating students about the main problems and development prospects of modern botany, instilling in them the importance of the efficient use and protection of plant cover; 3. Forming a worldview that approaches these areas scientifically and methodologically correctly and increasing interest in botany			
Learning Outcomes			
Understand Plant Biology and Diversity -Describe the characteristics, classification, and evolutionary relationships among major plant groups (e.g., bryophytes, ferns, gymnosperms, angiosperms).			
Explain Plant Structure and Function -Identify the anatomy of roots, stems, leaves, flowers, and reproductive organs.Explain physiological processes such as photosynthesis, respiration, transpiration, and nutrient transport.			
Recognize Plant Ecological Roles -Evaluate the roles of plants in ecosystems (e.g., producers, nutrient cyclers, habitat providers).Understand plant interactions with other organisms, including pollinators and symbionts.			
At the end of the course the student will be able to			Assessment
1	Know the categories of plant systematics;		
2	To form students' ideas about the goals and objectives of training;		
3	Know the structural features of a typical plant cell		
4	Knowing the structure and characteristics of 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		History of the development of botany. Branches and methods of botanical science. Azerbaijani botanists	

2		The structure and distinctive features of the plant cell. Differences in plant cell division. Cytokinesis	
3		Structure and functions of plant tissues (meristema, covering, parenchyma)	
4		Structure and functions of plant tissues (absorptive, mechanical, conductive, secretory)	
5		Anatomical and morphological structure of vegetative organs of plants, their development. The emergence of vegetative organs in evolution.	
6		Functions of vegetative organs. Photosynthesis, transpiration, transport of substances through the stem.	
7		The structure and functions of the generative organs of the plant. Flowers, fruits and seeds	
8		Reproduction of higher plants: vegetative reproduction, asexual reproduction, sexual reproduction. Sexual reproduction by seeds.	
9		Systematics of primary plants. Algae. Lichens. The role of primary plants in nature and their economic importance.	
10		Systematics of higher plants. Department of Bryophytes. Department of Ferns. Evolution and origin of higher plants	
11		Ancient gymnosperms. Gymnosperm department. Characteristic features and main taxons.	
12		Department of angiosperms. Important morphological and biological characteristics. Main classes and important representatives. Class of monocotyledons	
13		Class Bilirubin. Important morphological and biological characteristics. Classification of the class, families.	
14		The importance of plants in nature and human life.	
15		Mushrooms, structure, classification, importance.	
16		Lab 1: Microscopic Study of Plant Cell Structure and Organelles	
17		Lab 2: Observation of Mitosis in Plant Cells	
18		Lab 3: Study of Different Types of Plant Tissues	
19		Lab 4: Anatomical Analysis of the Root, Stem, and Leaf	
20		Lab 5: Observation of Stomata and Transpiration Process	
21		Lab 6: Structure and Dissection of Flowers and Fruits	
22		Lab 7: Identification of Algae and Lichens	
23		Lab 8: Classification and Identification of Fungi	

- Recommended Sources TEXTBOOK(S)
"Plant Biology" by Linda E. Graham, James M. Graham, and Lee W. Wilcox
- "Botany for Gardeners" by Brian Capon
- "The Botany of Desire: A Plant's-Eye View of the World" by Michael Pollan
- "Plant Systematics: A Phylogenetic Approach" by Walter S. Judd, Christopher S. Campbell, Elizabeth A. Kellogg, Peter F. 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			210
Total Workload/30(h)			210\30
ECTS Credit of the Course			7

MODULE HANDBOOK

Bachelor program in water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Microbiology
Course Unit Code	İF-B06
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)	2
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	phD Humatov Mahmud Farzali
Name of Lecturer (s)	phD Humatov Mahmud Farzali
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
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 about antibiotics, infection, and immunity will be provided.		
Objectives of the Course: To teach the basics of this science and to form an understanding of their application in life. One of the goals of the course is to create conditions for students to increase their biological knowledge, develop critical thinking and problem-solving skills by working with examples and examples. One of the goals of the course is to give students experience with concepts used in science such as observation, logic, analysis, objectivity, accuracy and fluent communication.		
Learning Outcomes		
Understanding Microbial Diversity. Identify and classify different groups of microorganisms (bacteria, viruses, fungi, protozoa, and algae).		
Understand the characteristics and structure of prokaryotic and eukaryotic cells. Recognize the importance of microbes in various environments (e.g., soil, water, human body).		
Microbial Physiology and Metabolism-Understand the basic metabolic pathways in microorganisms (e.g., glycolysis, fermentation, respiration). Identify the factors that affect microbial growth, such as temperature, pH, and nutrient availability.		
Discuss how microbes adapt to different environments. Microbial Genetics Understand the principles of microbial genetics, including gene transfer mechanisms (e.g., transformation, transduction, conjugation).		
Discuss the role of plasmids and other genetic elements in microbial evolution and antibiotic resistance.		
Understand the mechanisms of gene expression and regulation in microorganisms.		
At the end of the course the student will be able to		Assessment
1	To provide students with knowledge about the morphology, ultrastructure, role in the environment, genetics, and physiology of microorganisms.	
2	Supporting students academically and helping them realize their potential.	
3	To encourage student participation in the course and to ensure an environment of mutual respect and understanding.	
4	Connecting microbiology with other biological disciplines	
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	Exam
	Topics	

1		The subject, tasks and main directions of microbiology.	
2		The history of the emergence and development of microbiology.	
3		Morphology and anatomy of microorganisms	
4		Physiology of microorganisms	
5		Genetics of microorganisms	
6		Systematics of microorganisms: viruses, bacteriophages, bacteria, fungi, algae	
7		Distribution of microorganisms in nature: microbiota of air, water, soil	
8		The influence of environmental factors on microorganisms. biotic and abiotic factors	
9		Interactions between microorganisms.	
10		Important biochemical reactions caused by microorganisms	
11		The participation of microorganisms in the cycle of substances	
12		Pathogenic microorganisms and infections.	
13		Understanding immunity and immunology	
14		Gram positive, Gram negative bacteria. Pathogenicity factors of microorganism.	
15		Concept of virulence	
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)			
- "Microbiology: An Introduction" by Gerard J. Tortora, Berdell R. Funke, and Christine L. Case			
- "Mackie and McCartney Practical Medical Microbiology" by J.G. Collee, A.G. Fraser, B.P. Marmion, and A. Simmons			
- "Microbial Ecology: Fundamentals and Applications" by Ronald M. Atlas and Richard Bartha			
- "Prescott's Microbiology" by Joanne Willey, Linda Sherwood, and Christopher J. Woolverton			
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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	General biology
Course Unit Code	İF-B05
Type of Course Unit	Campulsory
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	Abdullayeva Reyhan Kamil
Name of Lecturer (s)	Abdullayeva Reyhan Kamil
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	General biology - covers the basic biological principles and concepts, studies living things and life

<p>processes at various levels of structure, and the laws that are specific to species and common to all organisms. General biology is a complex subject and consists of several sections such as cytology, biochemistry, genetics, evolutionary studies, ecology, and biosphere studies.</p>		
<p>Objectives of the Course: 1. To study the regularities of functioning of biological systems at the molecular, cellular, organismal, population, biogeocenosis and biosphere levels 2. To study the general characteristics of living things: variability, heredity, metabolism, etc. 3. To analyze the interaction of biological systems at different levels of life 4. To describe the processes of micro- and macroevolution; 5. To study the mechanisms of interaction of living things with the environment.</p>		
<p>Learning Outcomes Understanding of Basic Biological Principles. Describe the structure and function of cells, tissues, and organs in living organisms. Explain the principles of genetics, including inheritance patterns, genetic diversity, and mutation. Understand the processes of evolution and natural selection. Cellular Biology and Biochemistry understand the structure and function of biological macromolecules (proteins, lipids, carbohydrates, nucleic acids). Describe the processes of cellular respiration, photosynthesis, and fermentation. Understand cell division, including mitosis and meiosis, and their roles in growth, reproduction, and genetic diversity.</p>		
At the end of the course the student will be able to		Assessment
1	The basic characteristics and levels of structure of living organisms and the chemical composition of living things	
2	Structure, functions, molecular composition, division, life cycle and types of metabolism of prokaryotic and eukaryotic cells	
3	Pathways of energy and metabolic processes in plant and animal cells. Photosynthesis	
4	Organic composition of the organism, protein synthesis processes	
5	General basics of gene, genome, heredity and evolution teaching	
6	Reproduction and development of organisms. Ontogenesis and phylogenesis	
7	Biological diversity, its protection	
8	Ecosystems, the effects of ecology, climate and global climate change on organisms.	
<p>Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz</p>		
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 subject of general biology, its relationship with other sciences. The main characteristics of living organisms	
2		Cell theory. Cell morphology. Prokaryotic and eukaryotic cells. Different and similar features of plant and animal cells	
3		Laboratory work No. 1: Design and application of light microscopes in general biology	
4		Inorganic and organic substances of the cell: carbohydrates, fats, proteins. Their structures, functions and importance in the vital activity of the cell. Denaturation ability of proteins Laboratory work No. 2 Study of the elementary and molecular composition of living things	
5		Protein synthesis, transcription and translation processes. Nucleic acids, their types and functions.	
6		Cellular metabolism. Photosynthesis. Cellular respiration and its regulation. Laboratory work No. 3 Study of the structure of a plant cell (using the example of preparing unstained onion peel)	
7		Fundamentals of genetics, heredity and variation. Mendel's laws. Chromosomal basis of heredity. Autosomal inheritance, Morgan's law. Structure of DNA and basics of replication. Concept of GMO. Mutations.	
8		Ontogenesis, embryonic development of animals. Blastulation and gastrulation. Postembryonic development. Direct and indirect development. Organogenesis	
9		The concept of species, characteristics of the species, its origin and evolution. Population and its forms	
10		Theory of evolution	
11		Structure and physiological properties of plants. Plant nutrition, transport of water and minerals. Plant reproduction. Pollination and fertilization. Laboratory work No. 4 Study of the structure of a plant cell (using the example of preparing unpainted onion peel)	
12		Plant kingdom, classification. Primary and higher plants. Algae, mosses, ferns. Gymnosperms and angiosperms. Laboratory work No. 5 Isolation of DNA from plant tissues	
13		Structure and physiology of animals. Musculoskeletal system. Nutrition and digestive system.	
14		Respiratory, endocrine, immune and circulatory systems of animals. Reproduction and development of animals.	
15		Fundamentals of ecology. Biosphere education. Ecosystems. The concept of biodiversity and its protection	
16		Laboratory work No. 1: Design and application of light microscopes in general biology	
17		Laboratory work No. 2 Study of the elementary and	

		molecular composition of living things	
18		Laboratory work No. 3 Study of the structure of a plant cell (using the example of preparing unstained onion peel)	
19		Laboratory work No. 4 Study of the structure of a plant cell (using the example of preparing unpainted onion peel)	
20		Laboratory work No. 5 Isolation of DNA from plant tissues	
<p>Recommended Sources TEXTBOOK(S)</p> <ul style="list-style-type: none"> - "Biology" by Neil A. Campbell and Jane B. Reece - One of the most widely used introductory biology textbooks. It covers all essential topics such as cell biology, genetics, evolution, ecology, and physiology in great detail. - "Biology: The Essentials" by Mariëlle Hoefnagels - A concise version of Campbell's textbook, this is suitable for students looking for a more condensed approach to general biology. - "The Biology of Cells and Organisms" by J.D. Pollard - Focuses on cellular biology and the processes at the molecular level, ideal for students who wish to focus on cellular aspects of biology. - "Molecular Biology of the Cell" by Alberts, Johnson, Lewis, Raff, Roberts, and Walter - A more advanced and specialized text that provides in-depth coverage of cell biology, cell processes, and molecular biology. 			
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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Introduction to the specialty and the history of the development of the specialty
Course Unit Code	İF-B07
Type of Course Unit	Campulsory
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	Ahmadova Konul Yaşar
Name of Lecturer (s)	Ahmadova Konul Yaşar
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 “Introduction to the specialty and history of the development of the specialty” provides information about marine life of Azerbaijan, organisms of national importance living in the internal and territorial water bodies of Azerbaijan, their reproduction and breeding. The program will provide students with information about the main biotechnical stages of breeding organisms. Stimulation of the maturation of reproductive products of producers by ecological, physiological and combination methods, collection of reproductive products by various methods. Methods of fertilization of eggs taken from producers, their release from adhesion and placement in various types of incubation devices. Types of incubation devices. Working principle and technical characteristics of incubation devices. Incubation of eggs after fertilization and the formation of larvae. Breeding of fish fry to a standard mass depending on the species	
Objectives of the Course: The aim of the course is to teach students innovative biotechnologies for the artificial cultivation of important organisms in Azerbaijan and the world. Information will be provided on the scientific foundations of the efficient use of algae, mollusks and crustaceans as components of aquatic bioresources, and the technologies for their cultivation in natural and artificial water bodies.	
Learning Outcomes Ancient Practices (Around 3000 BCE – 500 CE): The earliest known examples of aquaculture come from ancient China, where people began cultivating fish such as carp in controlled ponds as early as 3000 BCE. The Chinese also developed techniques for breeding fish in captivity. Ancient Egyptians and Greeks practiced similar methods, cultivating fish in ponds and managing natural water resources. In Rome, the wealthy Roman elite would have fishponds to raise fish like tilapia, eels, and oysters. Medieval Aquaculture (500 CE – 1500 CE): Aquaculture saw limited growth in Europe during the medieval period. Monasteries in Europe, especially in the 12th and 13th centuries, were known to maintain fishponds for both food production and religious reasons. In Japan, pond culture of carp (Koi) became an important tradition, focusing on ornamental purposes as well as food production. Industrial Revolution (18th – 19th Century): Aquaculture techniques advanced significantly during the industrial revolution due to improvements in technology and transportation. However, it was not until the	

late 19th century that modern aquaculture began to take shape with the development of hatcheries for fish like salmon and trout. In the United States, the establishment of fish hatcheries in the late 1800s marked the beginning of more organized aquaculture practices.

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 "Introduction to the specialty and the history of the development of the specialty", scientific research methods, and its relationship with other sciences;	
2	Formation of ideas about the biotechnical stages of modern freshwater and mariculture with innovative methods	
3	Formation of ideas about training tools	

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		Aquaculture Review. History of Fisheries in Azerbaijan	
2		Ecological groups of aquatic organisms	
3		Fishing. Growing sardines, carp and herring	
4		Aquaculture breeding methods	
5		Aquatic bioresources. Biological productivity of water.	
6		Natural and artificial reservoirs	
7		Algae cultivation	
8		Commercial fish farms	

Recommended Sources TEXTBOOK(S)

- **"Aquaculture: An Introduction" by Robert R. Stickney**
- A comprehensive introduction to the field of aquaculture, covering the biological, economic, and technological aspects of aquatic farming.
- **"Introduction to Aquaculture" by John S. Lucas & Paul C. Southgate**
- This book provides a detailed look at aquaculture, focusing on different species and production systems, with a global perspective on the industry's development.
- **"Aquaculture: Farming Aquatic Animals and Plants" by T. V. R. Pillay and M. N. Kutty**

<ul style="list-style-type: none"> - Covers all aspects of aquaculture, from basic biological principles to industrial practices, providing a historical overview and future challenges. - "The History of Aquaculture" by John R. Shroeder - This book focuses on the historical development of aquaculture practices across different regions and cultures, tracking its evolution over millennia. - "Aquaculture: Farming Aquatic Animals and Plants" by Michael B. New & William H. Ellis - Focuses on the technical and scientific aspects of aquaculture and gives a history of various aquaculture systems. 			
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

Bachelor program in water bio-resources and aquaculture, Department of “Information and technologies”.

Course Unit Title	Computer science	
Course Unit Code	IF-B09	
Type of Course Unit	Compulsory	
Level of Course Unit		
National Credits	-	
Number of ECTS Credits Allocated	4	
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	Mustafayeva Sabina	
Name of Lecturer (s)	Mustafayeva Sabina	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
Brief information about the subject, the purpose of teaching the subject, the methods to be applied in teaching the subject are explained in writing. What students will know, what they will achieve and what skills they will acquire by studying this subject are noted.) The role of informatics in science, technology and other fields, types, properties of information, units of measurement of information, architecture of computers and their development history, structure and components, main devices and their purpose, peripheral devices and their purpose are taught. Computer software, understanding of the Windows operating system, architecture of the Windows system, main parameters and working principle are explained. Desktop, working with windows, setting the main parameters, working with folders and files.		
Objectives of the Course: The "Computer Architecture" course widely applies the study and use of modern technical tools. Therefore, future specialists studying in the relevant areas must master the capabilities of technical tools.		
Learning Outcomes		
Programming Proficiency: The ability to write, test, and debug programs in various programming languages (e.g., Python, Java, C++, etc.).		
Algorithms and Data Structures: Understanding core algorithms and data structures, and knowing how to select the most appropriate ones for different problems.		
Software Development: Knowledge of software development life cycles, including requirements gathering, design, implementation, testing, and maintenance.		
Computer Systems: Understanding of how computers work at a hardware and operating system level (e.g., memory management, file systems, concurrency).		
Databases: Understanding of database design, SQL, and relational database management systems.		
At the end of the course the student will be able to		Assessment
1	Formation of ideas about the goals and objectives of computer science as a science, scientific research methods, and its relationship with other sciences;	
2	Formation of ideas about the principles and teaching methods of computer science;	
3	Formation of ideas about the forms of organizing computer science	

	training;		
4	Formation of ideas about the means of teaching informatics		
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		Informatics as a fundamental science and its tasks. The concept of information, its properties, forms, units of measurement.	
2		Basic computer devices.	
3		Computer system and application software	
4		Classification of operating systems. Structure of the Windows operating system.	
5		Word processors. Word text editor and its main features.	
6		Computer graphics. Color models.	
7		MS Excel spreadsheet. Cell, block, page. Creating charts. Filter and sort operations.	
8		Classification, architecture, types, topology of computer networks. Structure of the Internet network.	
Recommended Sources TEXTBOOK(S)			
<ul style="list-style-type: none"> - "Introduction to the Theory of Computation" by Michael Sipser A foundational text for understanding the theoretical underpinnings of computer science, including automata theory, formal languages, and computational complexity. - "Discrete Mathematics and Its Applications" by Kenneth H. Rosen An essential text for learning discrete mathematics, which is fundamental to computer science, covering topics like logic, set theory, and combinatorics. - "Computational Complexity: A Modern Approach" by Sanjeev Arora and Boaz Barak A comprehensive introduction to computational complexity, providing insights into modern 			

<p>complexity theory.</p> <p>- "Design Patterns: Elements of Reusable Object-Oriented Software" by Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides Introduces 23 classic design patterns that help software developers design flexible and reusable object-oriented systems.</p>			
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 water bio-resources and aquaculture, Department of “Ecology and environment”.

Course Unit Title	Meteorology and climatology	
Course Unit Code	IF-B08	
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	Mikayilov Aruz Metaf	
Name of Lecturer (s)	Mikayilov Aruz Metaf	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
<p>Meteorology and climatology are sciences that, based on the laws of physics, study certain physical processes inherent to the Earth and the set of atmospheric conditions specific to that area, depending on the geographical location of any territory. In order to understand the laws of climate, it is necessary to have a deep understanding of the general laws to which atmospheric processes are subject. Therefore, when analyzing the causes of the formation of various climate types and the reasons for their distribution on Earth, climatology is based on the concepts and laws of meteorology. In this course, meteorology and climatology will be studied not separately, but as a complete unity</p>		
<p>Objectives of the Course:The main goal of the subject is to familiarize undergraduate students with the physical phenomena occurring in the atmosphere, their causes and regularities between them, dangerous atmospheric phenomena, long-term changes in climatic factors and modern methods used in climate research, the physical life of the atmosphere, the physical explanation of individual processes and phenomena occurring in the atmosphere, the reasons for the dependence and connection between them, and ways to meet the needs of the national economy, not only through observation and description of atmospheric phenomena.</p>		
Learning Outcomes		
<p>Understanding Atmospheric Processes:Explain the physical processes that drive weather, including radiation, convection, and the water cycle.Describe the structure of the atmosphere and its layers.Identify the different types of clouds and weather phenomena associated with each.</p>		
<p>Weather Systems and Phenomena:Understand and predict the formation of weather systems such as high and low-pressure areas, fronts, and cyclones.Analyze and interpret weather maps and satellite imagery.Recognize and understand severe weather events like thunderstorms, tornadoes, hurricanes, and blizzards.</p>		
At the end of the course the student will be able to		Assessment
1	After completing the course, students will be able to independently:	
2	Summarize stationary observation data on meteorological elements that create and	

	change climate;		
3	The rules for measuring meteorological elements at the experimental station; the regularity of changes in the properties of the air, that is, meteorological elements.		
4	Assessment of the impact of agricultural and human economic activities on changes in the atmosphere near the Earth's surface.		
5	Assessment of the content of atmospheric conditions specific to the area, depending on the geographical location of the area		
6	After completing the course, students will be able to independently:		
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		Goals and objectives of meteorology and climatology	
2		Composition and structure of the atmosphere	
3		Geographic distribution of solar radiation	
4		Atmospheric pressure, its periodic and non-periodic changes	
5		Cyclones and Anticyclones	
6		Clouds. International classification of clouds	
7		Atmospheric precipitation and its formation,	
8		Geographical distribution of atmospheric precipitation	
9		Air currents in the atmosphere. Winds	
10		Types of winds	
11		Air masses and atmospheric fronts	
12		Factors that create climate. Climatic zones	
13		Meteorological observations and experiments.	
14		Climate of Azerbaijan	
15		The economic importance of meteorology and climatology	
Recommended Sources TEXTBOOK(S)			

- **"Meteorology: Understanding the Atmosphere"** by Steven A. Ackerman and John A. Knox-This is a widely used introductory textbook that covers the fundamental principles of meteorology and provides a solid understanding of atmospheric processes.
- **"Atmospheric Science: An Introductory Survey"** by John M. Wallace and Peter V. Hobbs-A classic textbook that introduces key concepts in atmospheric science, including weather patterns, atmospheric dynamics, and forecasting.
- **"The Atmosphere: An Introduction to Meteorology"** by Frederick K. Lutgens and Edward J. Tarbuck-A comprehensive, accessible text for understanding the physical properties and processes that govern weather and climate.
- **"Weather and Climate"** by John E. Oliver and Thomas H. Hidore-This book covers both weather and climate, making it a useful reference for students and professionals interested in the broader context of meteorological processes.

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Fishing	
Course Unit Code	IF-B11	
Type of Course Unit	Compulsory	
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 Memmedov Chingiz Agamusa	
Name of Lecturer (s)	PhD Memmedov Chingiz Agamusa	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
<p>In the lectures of the subject "Fisheries", students are provided with extensive information about the structural features and movement forms of fish related to their adaptation to the aquatic environment, abiotic and biotic factors affecting their development, the basic principles of their distribution, fish populations and their structure, as well as types of reproductive populations. The program also teaches students detailed knowledge about fish feeding, determining the rate of development, reproduction and productivity, systems, types and rules for creating pond farms, as well as methods of marking fish, regularities in changing the amount of fish resources, and the biological foundations of rational fisheries.</p>		
Objectives of the Course:		
<p>The purpose of the "Fisheries" subject is to teach students the technologies of artificially breeding and breeding fish species of national importance, to explain the modern methods used in the aquaculture process and their importance, and to explain the importance of rational fisheries.</p>		
Learning Outcomes		
<p>Understanding of Fishing Equipment Outcomes: Knowledge of different fishing rods, reels, lines, and tackle. Understanding how to choose the right gear based on the type of fishing (e.g., freshwater vs. saltwater). Proficiency in setting up and maintaining fishing equipment.</p>		
At the end of the course the student will be able to		Assessment
1	To know the body structure of fish and their adaptations to the aquatic environment. To know the effects of abiotic and biotic factors on fish.	
2	Be able to identify the species, age, and maturity stages of fish.	
3	To be able to calculate the spawning productivity, spawning capacity of fish. To know the principles of procurement, selection and reservation of spawning fish in factory conditions.	

4	Know the methods for determining the amount of fish resources in natural and artificial water bodies.		
5	Knowing the fishing gear used in fishing and the rules for using it		
6	To know the methods of marking fish using modern 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		Structural features of fish	
2		Rules for collecting and processing ichthyological materials	
3		Basic requirements for water quality in fish farming	
4		Biological and economic characteristics of the main fish species grown in aquaculture conditions	
5		Methods for studying fish feeding	
6		Methods for assessing fish growth rate	
7		Types and characteristics of pond farms	
8		Technology for breeding and cultivating fish in ponds of various categories	
9		Estimation of fish resources	
10		Fish reproduction	
11		Fish productivity	
12		Study of the reproductive structure and reproduction of fish	
13		Fish marking and its importance in fisheries	
14		Regularities of fish resource recovery and quantity changes	
15		Biological foundations of rational fisheries.	
Recommended Sources TEXTBOOK(S)			
"The Complete Fishing Manual" by Henry Gilbey			
A comprehensive guide that covers everything from basic to advanced fishing techniques for both freshwater and saltwater fishing.			
"The Little Red Book of Fly Fishing" by Kirk Deeter and Charlie Meyers			
A concise yet informative guide that explores fly fishing techniques, tips, and advice, offering an			

approachable method for beginners and experts alike.

"The Orvis Fly-Fishing Guide" by Tom Rosenbauer

One of the most popular and respected books on fly fishing, this guide covers the basics of casting, reading water, and choosing the right gear.

"The Total Fishing Manual" by Joe Cermele

A well-rounded guide that focuses on techniques and strategies for different types of fishing, with tips from seasoned anglers.

"Saltwater Fishing for Dummies" by Adriean G. Sweeney

A beginner-friendly book that introduces the essentials of saltwater fishing, including gear, techniques, and species.

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Physiology of aquatic plants	
Course Unit Code	IF-B10	
Type of Course Unit	Campulsory	
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	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	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
<p>Aquatic plant physiology is a science that studies the life events occurring in aquatic plant organisms, explains them, reveals regularities, and shows the way to control the plant organism on this basis. Aquatic plant physiology is one of the main branches of botany. Aquatic 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 the plants, it is necessary to know their life perfectly. Without knowing the vital events occurring inside plants and without understanding them deeply, it is impossible to control the development and flowering of plants and give them any direction to obtain high yields.</p>		
Objectives of the Course:		
<p>The main goal of the subject is to provide students with theoretical knowledge in this area, to help them master practical skills and to study the importance of the essence of physiological and biochemical processes occurring in the plant body, as well as the regularities of the formation of growth and development in plants.</p> <ul style="list-style-type: none"> - teaching the theoretical and practical importance of the physiology of aquatic plants, the mechanism of all the main physiological processes occurring in the plant body; - educating students about the main problems and development prospects of modern aquatic plant physiology, instilling in them 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. 		
Learning Outcomes		
<p>Identify different types of aquatic plants (emergent, floating, submerged, and marginal) and their adaptations to the aquatic environment.</p> <p>Distinguish between freshwater and marine aquatic plants in terms of structure, function, and environmental adaptations.</p>		
At the end of the course the student will be able to		Assessment
1	The subject of aquatic plant physiology, its brief history of development, the main problems and development prospects of modern botany;	
2	Characteristics of the life activity of a typical plant cell;	

3	General characteristics of plant tissues, the interrelationships between the functions of the organs they form; -the mechanism of all the main physiological processes occurring in the plant organism, the characteristics of growth and development;		
4	Use ICT and electronic resources for sections and topics, prepare various electronic teaching materials and presentations.		
5	The subject of aquatic plant physiology, its brief history of development, the main problems and development prospects of modern botany;		
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, goal and task of the subject of aquatic plant physiology	
2		Plant cell physiology	
3		Photosynthesis. The importance of photosynthesis and the history of the development of the study of it. The structure of the photosynthetic apparatus	
4		Photosynthesis. Chemical composition of chloroplasts and their enzymes. Pigments	
5		Photosynthesis. The influence of external conditions on the intensity of photosynthesis. Photosynthesis and yield	
6		Respiration. Respiration of aquatic plants and its importance. History of the development of the study of respiration	
7		Respiration. Respiration is a central part of metabolism in a plant cell. Respiration and photosynthesis	
8		Respiration. Components of the respiratory cycle	
9		The importance of water in the life of a plant. The history of the development of the study of water exchange. Water exchange in plants	
10		The state of water in the tissues of aquatic plants. Characteristics of the stomatal apparatus and the evaporative surface. Transpiration	
11		Mineral and organic nutrition. Formation of the absorptive apparatus	

		of plants	
12		Mineral nutrition, the influence of various environmental factors on it. The use of organic matter	
13		Plants and the environment. Interactions of higher aquatic plants with prokaryotes, some primitive plants, and higher plants	
14		The influence of various factors on higher aquatic plants	
15		Higher aquatic plants - as a powerful factor in the self-cleaning of reservoirs	
16		Lab 1: Permeability of living and non-living protoplasm to cell sap.	
17		Lab 2: Absorption spectra of the alcohol fraction of chlorophyll and its individual pigments	
18		Lab 3: Growing plants in various solutions containing complete and incomplete nutrients	

Recommended Sources TEXTBOOK(S)

- **"Aquatic Plants: Biology, Ecology, and Management"** by K.V. Krishnamurthy
- This book provides an in-depth look at the biology and ecology of aquatic plants, including their physiological processes, adaptation strategies, and environmental significance.
- **"The Biology of Aquatic Vascular Plants"** by A.R. McComb & L.B. Robinson
- A detailed text on the biology and physiology of aquatic vascular plants, discussing their structure, function, and interactions with the aquatic environment.
- **"Aquatic Plant Management"** by A.J. R. Prentice
- A practical guide that discusses the management and ecological implications of aquatic plants, with sections on their physiology, reproduction, and adaptive strategies.
- **"Freshwater Ecology: Concepts and Environmental Applications"** by William D. Williams
- Though focused on freshwater ecology in general, this textbook provides important insights into the role of aquatic plants in freshwater ecosystems, including physiological aspects.
- **"Ecology of Aquatic Systems"** by Michael J. Kennish
- This book provides an integrated view of aquatic ecology, covering the physiological processes of aquatic plants and their importance in aquatic systems.

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Zoology
Course Unit Code	İF-B12
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	3
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Ahmadova Konul Yaşar
Name of Lecturer (s)	Ahmadova Konul Yaşar
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: "Zoology course" 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 the entire animal kingdom, providing extensive information about the structure, classification, lifestyle, role in the biosphere and importance in human life of various animals at different stages of development, their origin and evolution. 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.	
Learning Outcomes Understanding Animal Diversity: Identify and classify a wide variety of animal species across different phyla and classes. Understand taxonomy and phylogenetic relationships among different animal groups. Develop a clear understanding of the evolutionary processes that have shaped the diversity of animal	

life.			
At the end of the course the student will be able to		Assessment	
1	To become familiar with the subject, goals and objectives of zoology;		
2	As a result of studying the subject, acquire knowledge about the main characteristics of animals belonging to various systematic groups;		
3	To have the ability to describe primitive invertebrates;		
4	To learn about the effective use and conservation of animals, the importance of regional and international cooperation, species introduced to the local fauna, the reasons why animals are rare, etc.		
5	The scientific, economic, technical, educational, medical, aesthetic, and natural significance of animals, the attitude of the population towards animals (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;		
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 subject, objectives, history of development of the science and scientific directions of zoology. The kingdom of Protozoa or Unicellular Organisms (Protozoa)	
2		Origin of multicellular animals. (Placozoa) phylum. Sponges (Spongia) phylum	
3		Coelenterata phylum. Combs (Ctenophora) phylum	
4		Phylum (Acoelomata) or (Scolecida). Phylum (Plathelminthes)	
5		Phylum (Nemertini). Phylum (Nemathelminthes). Phylum (Acanthocephalus)	
6		Ringworms (Annelida) type	
7		Phylum Arthropoda (Arthropoda). Subphylum Chelicerata (Chelicerata)	
8		Subtype Tracheata (Tracheata). Class Myriapoda (Myriapoda).	

9		Subphylum (Tracheata). Class (Insecta)	
10		Phylum (Onychophora). Phylum (Mollusca)	
11		Phylum (Tentaculata). Phylum (Echinodermata)	
12		Type of hemichordates (<i>Hemichordata</i>)	
13		Pogonophores (<i>Pogonophora</i>) . Sword-jawed type (<i>Chaetognatha</i>)	
14		Primitive chordates. Subtypes of cephalopods and tunicates	
15		Class Roundmouths. Biology of the Caspian lamprey	
16		Cartilaginous fish class	
17		Class bony fish	
18		Amphibian class	
19		Class Reptiles	
20		A class of birds	
21		Characteristics, classification, skin and skeletal structure of mammals	
22		Internal organs and nervous system of mammals, their ecology and importance in the biocenosis	
23		The main stages of the phylogenetic development of the animal kingdom	

Recommended Sources TEXTBOOK(S)

- **"Animal Diversity"** by **Cleveland P. Hickman, Larry S. Roberts, and Allan Larson**-A comprehensive textbook that covers a wide range of animal phyla, focusing on their diversity and evolutionary relationships. It's a great introduction to animal classification and systematics.
- **"Zoology"** by **Stephen A. Miller and John P. Harley**-This textbook provides a thorough overview of zoology, covering animal structure, function, ecology, evolution, and classification. It's suitable for both introductory and advanced courses.
- **"Principles of Animal Physiology"** by **Christopher D. Moyes and Peter W. Schulte**-A detailed textbook focused on the physiological processes that govern animal function, from cellular mechanisms to organ systems.
- **"Ecology of Animals"** by **Peter M. Chapman**-This book focuses on the relationships between animals and their environment, covering ecology at various scales, from individual organisms to populations and ecosystems.
- **"Developmental Biology"** by **Scott F. Gilbert**-A widely used textbook on developmental biology, this book covers the principles of animal development, from fertilization to organogenesis.

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Biochemistry
Course Unit Code	İF-B14
Type of Course Unit	Compulsory
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 Nigar Huseynova
Name of Lecturer (s)	PhD Nigar Huseynova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
Biochemistry is a science that studies the structure, diversity, properties, and transformations of organic compounds that make up living organisms. The subject of biochemistry is conventionally divided into static biochemistry, dynamic biochemistry, and functional biochemistry. Static biochemistry studies the structure and properties of proteins, carbohydrates, nucleic acids, lipids, and other organic compounds that make up living organisms. Dynamic biochemistry studies the biosynthesis and degradation of organic compounds that make up living organisms, and the regulation of these processes. Functional biochemistry studies the relationship between biochemical transformations and the activity of organs and tissues.	
Objectives of the Course:	
To obtain information about the structure, properties, and transformations of organic compounds that make up living things, to study the mechanisms of regulation of these processes, and to acquire some	

knowledge necessary for the study of enzymology, molecular biology, and other sciences.			
Learning Outcomes			
Understand the structure and function of biomolecules , including proteins, carbohydrates, lipids, and nucleic acids.			
Describe enzyme function , mechanisms, kinetics, and regulation.			
Explain key metabolic pathways , such as glycolysis, the citric acid cycle, oxidative phosphorylation, and photosynthesis.			
Understand the flow of genetic information , including replication, transcription, and translation.			
At the end of the course the student will be able to			Assessment
1	Describes the structure of nucleic acids, enzymes, hormones, proteins, carbohydrates, lipids, and vitamins;		
2	It explains the chemical composition and properties of substances in the body, their transformation, the chemical processes that form the basis of life activity, and the mechanism of metabolism;		
3	Determines the characteristics and quantities of proteins, nucleic acids, carbohydrates, lipids, minerals, vitamins, and hormones in biological materials;		
4	Compiles reaction equations related to chemical processes occurring in the body;		
5	Evaluates the obtained analysis results;		
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. The subject of biochemistry, branches and development history. The elemental composition of living organisms	
2		The organic composition of the cell. Proteins, amino acids and peptides.	
3		Structure, properties, functions and classification of proteins. Simple proteins.	
4		Principles of protein classification	
5		Enzymes. Properties of enzymes	
6		Nomenclature of enzymes	

7		Carbohydrates, their properties and functions	
8		Biosynthesis of carbs. Gluconeogenesis.	
9		Lipids, their structure and properties.	
10		Metabolism of dietary lipids. De novo synthesis of FA. Oxidation of FA. Beta-oxidation of FA	
11		Nucleic acids. Their structure, functions and classification.	
12		Eukaryotic cell cycle.	
13		Mutations. The types of mutations. Reparation, mechanism and types.	
14		Gene expression and its steps. Regulation of gene expression.	
15		Bioenergetics and oxidative phosphorylation.	

Recommended Sources TEXTBOOK(S)

- **Lehninger Principles of Biochemistry**
David L. Nelson & Michael M. Cox
- A comprehensive, widely adopted textbook with detailed explanations and figures.
- **Biochemistry**
Jeremy M. Berg, John L. Tymoczko, Gregory J. Gatto, & Lubert Stryer
- Known for its clarity and focus on molecular understanding of life processes.
- **Biochemistry**
Donald Voet & Judith G. Voet
- More detailed and theoretical; great for advanced students.
- **Fundamentals of Biochemistry: Life at the Molecular Level**
Donald Voet, Judith G. Voet, & Charlotte W. Pratt
- Focuses on a practical understanding of core biochemical concepts.

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Aquaculture of aquatic plants		
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)	2		
Laboratory (hour/week)	-		
Year of Study	1		
Semester when the course unit is delivered	2		
Course Coordinator	Musayev Murad Qedim oğlu		
Name of Lecturer (s)	Musayev Murad Qedim oğlu		
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 "Aquaculture of Aquatic Plants" provides information on the distribution of plants in the internal and territorial water bodies of Azerbaijan, their bioecological characteristics, their reproduction, and important species.			
Objectives of the Course:			
Information will be provided on the scientific basis for the efficient use of aquatic plants, which are part of water bioresources in Azerbaijan, and plants distributed in natural and artificial water bodies.			
Learning Outcomes			
<i>Identify Major Cultivated Species- Identify key species used in aquaculture (e.g., seaweeds like kelp and nori, duckweed, water hyacinth, and seagrasses). Describe their biological characteristics and ecological roles.</i>			
At the end of the course the student will be able to			Assessment
1	Formation of ideas about the goals and objectives of the discipline "Aquaculture of Aquatic Plants", scientific research methods, and its relationship with other sciences;		
2	<i>Understand Basic Concepts- Define aquatic plants and distinguish between freshwater and marine species.</i>		
3	Explain the principles and importance of aquatic plant aquaculture in food security, environmental management, and commercial industries.		
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		Freshwater basins of Azerbaijan	
2		History of the botanical study of plants	
3		Biological and ecological characteristics of aquatic plants	
4		Analysis of aquatic plants according to their life forms	
5		Vegetation succession	
6		Yellow water, and vegetation of White Lake	
7		Vegetation of lakes located in the middle mountain belt	
8		Types of algae living in water	
9		Unicellular algae	
10		Analysis of species by ecological groups	
11		Diatomaceous earth spreading in water bodies	
12		Algae reproduction	
13		Bioecology of algae features	
14		The importance of algae.	
15		The red book of Azerbaijan	
Recommended Sources TEXTBOOK(S)			
McHugh, D. J. (2003). <i>A Guide to the Seaweed Industry</i> FAO Fisheries Technical Paper No. 441			
Lobban, C. S., & Harrison, P. J. (1994). <i>Seaweed Ecology and Physiology</i>			
Raven, J. A., & Giordano, M. (2009). <i>Algae</i>			
Sahoo, D., & Yarish, C. (2019). <i>Algal Biotechnology: Sustainable Solutions</i>			
Kumar, G., et al. (2015). <i>Advances in Aquatic Ecology</i>			
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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Planktonology
Course Unit Code	İF-B16
Type of Course Unit	Campulsory
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	Ahmadova Konul Yaşar
Name of Lecturer (s)	Ahmadova Konul Yaşar
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-

Recommended Optional Program Components		-
Course description: The course "Planktonology" is one of the main fundamental biological subjects, and is taught by students of the Faculty of Aquatic Bioresources and Aquaculture in the second year of study. The material of this course covers all plankton organisms, provides information about their characteristic features and classification, evolution, structural features of individual organ systems, their ecology, ethology, trophic relationships, 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 recognize plankton organisms, investigate their main characteristics, and acquire knowledge about the protection of aquatic animals, their current status, the current status of their habitats, the reasons for their decline, their importance in nature, etc.		
Learning Outcomes Define and classify plankton (phytoplankton, zooplankton, bacterioplankton, and mycoplankton) based on size, function, and trophic level. Describe the physiological and ecological characteristics of major plankton groups. Explain the role of plankton in aquatic food webs and biogeochemical cycles (carbon, nitrogen, and phosphorus).		
At the end of the course the student will be able to		Assessment
1	To become familiar with the subject, goals and objectives of planktonology;	
2	To become familiar with the characteristics and classification of aquatic animals, as well as their taxonomic characteristics;	
3	To learn the methodology for studying organisms belonging to the plankton group;	
4	To know the scientific and economic, as well as nature-related, importance of aquatic animals, their place in the classification, scientific name, and biological characteristics of the studied object;	
5	To learn about the effective use of plankton organisms	
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	Exam
1	Introduction to planktonology. History of the study of plankton	

2	General information about plankton
3	Buoyancy of aquatic organisms. Residual mass. Resistance of forms
4	Seasonal variability of planktonic organisms. Neuston – the upper layer of water. History of the study of Neuston
5	Dissolved organic matter in aquatic ecosystems. Bacterioplankton
6	The role of zooplankton in the transformation of organic matter
7	Zooplankton and watershed productivity
8	Regulation of zooplankton numbers
9	Regeneration of biogenic elements by zooplankton
10	Main components of zooplankton food
11	Zooplankton migration
12	General information about the trophodynamics of water bodies
13	Plankton algae
14	Anthropogenic eutrophication of water bodies
15	Biological resources of the world's oceans

Recommended Sources TEXTBOOK(S)
 "The Ecology of Phytoplankton" by C.S. Reynolds
 "Zooplankton of the Atlantic and Gulf Coasts: A Guide to the Zooplankton of Coastal Alabama" by William S. Johnson
 "Plankton: A Guide to Their Ecology and Monitoring for Water Quality" by P.S. Gauthier
 "Plankton: Diversity and Ecology" by L. Seuront and A. Viscosi
 "Marine Plankton: A Practical Guide to Ecology, Methodology, and Taxonomy" by Colin M. Adams, Martin J. L. Simpson

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Aquaculture of fish
Course Unit Code	İF-B17
Type of Course Unit	Campulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	3
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	b.ü.f.d,dosent Humbatov Mahmud Farzali oğlu
Name of Lecturer (s)	b.ü.f.d,dosent Humbatov Mahmud Farzali oğlu
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
<p>The program of the fish aquaculture subject provides information about fish, fish of national importance living in the inland and territorial water bodies of Azerbaijan, their reproduction and breeding. The program will provide students with information about the main biotechnical stages of fish breeding. Stimulation of the maturation of reproductive products of producers by ecological, physiological and combination methods, collection of reproductive products by various methods. Methods of fertilization of eggs taken from producers, their release from adhesion and placement in various types of incubation devices. Types of incubation devices. Working principle and technical characteristics of incubation devices. Incubation of eggs after fertilization and the formation of larvae. Breeding of fish fry to a standard mass, depending on the species.</p>	
Objectives of the Course:	
<p>The aim is to teach students innovative biotechnology in the artificial breeding of critically important species in Azerbaijan and the world.</p>	

Learning Outcomes			
Knowledge of Aquatic Ecosystems: Students will understand the ecological principles of aquatic ecosystems, including the importance of water quality, temperature, oxygen levels, and feeding practices for the healthy growth of fish.			
Fish Biology and Physiology: Students will gain an understanding of the biology, behavior, and physiology of the fish species being cultivated, including their life cycles, reproductive systems, and growth patterns.			
Types of Aquaculture Systems: Learn the various types of aquaculture systems, such as freshwater, marine, and brackish water systems, and the pros and cons of each.			
At the end of the course the student will be able to		Assessment	
1	Formation of ideas about the goals and objectives of the discipline "Fish Aquaculture", scientific research methods, and its relationship with other sciences;		
2	Formation of ideas about the biotechnical stages of modern freshwater and mariculture using innovative methods;		
3	Formation of ideas about the means of 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		Fish aquaculture	
2		Biological foundations of fish aquaculture	
3		Abiotic and biotic factors affecting the development of fish and other hydrobionts	
4		Ecological groups of fish	
5		Nationally important fish species of Azerbaijan	
6		Main biotechnical stages of fish aquaculture	
7		Sturgeon aquaculture	
8		Purchase of sturgeon reproductive products	
9		Fertilization and de-sticking of sturgeon eggs	

10		Raising sturgeon fry using various methods. Registration of fish fry	
11		Salmonid aquaculture	
12		Aquaculture of crustaceans	
13		Aquaculture of sturgeons	
14		Pond farms and their characteristics	
15		Understanding of fish farming land reclamation	
16		Methods of fertilizing ponds	
17		Cage aquaculture	
18		Aquaculture in closed water supply systems	
19		Cultivation of living organisms for fish feed	
20		Flounder mariculture	
21		Mariculture of mullets	
22		Mariculture of goldfish	
23		Breeding sturgeon in sea cages	

- Recommended Sources TEXTBOOK(S)
- **"Aquaculture: An Introduction"** by John S. Lucas & Paul C. Southgate
- A comprehensive introduction to the basics of aquaculture, including the biological, ecological, and economic aspects of fish farming.
- **"Fish Physiology and Biochemistry"** edited by J. F. O'Brien
- This book provides insights into the biology and physiology of fish, which is essential for understanding aquaculture practices.
- **"Aquaculture: Farming Aquatic Animals and Plants"** by John H. Tidwell
- A thorough guide on the culture of various aquatic species, covering both freshwater and marine fish farming.
- **"Principles of Fishery Science"** by Richard H. Peters
- This book provides a foundation for understanding the biological principles of fisheries, which is closely related to aquaculture.
- **"Aquaculture Production Systems"** by Seth P. R. T. D. & Olav K.
- Focuses on aquaculture systems, management, and their practical applications for sustainable fish farming.

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 water bio-resources and aquaculture, Department of “Department of mechanics and matematics”.

Course Unit Title	Feeding fish
Course Unit Code	İF-B18
Type of Course Unit	Campulsory
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 Chingiz Memmedov
Name of Lecturer (s)	PhD Chingiz Memmedov
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 “Fish Feeding” provides information on the importance of live and artificial feeds in modern aquaculture, feeding and digestion processes, the structure of the digestive system of fish depending on their feeding and biological characteristics, feed requirements, feed ratio and feed components. The program teaches students modern knowledge about live feed organisms, biotechnology of their breeding, feeding fish depending on their age and species, rules for preparing and storing mixed feeds using traditional and modern methods, plants producing mixed feeds and devices for their preparation, as well as methods for determining the quality of mixed feeds.	
Objectives of the Course:	
To teach students the rules of feeding fish, the characteristics of live food organisms and artificial feeds, the technologies of their breeding and preparation, and the rules of storage and analysis.	
Learning Outcomes	
Understanding Fish Nutrition: Recognize the nutritional requirements of different fish species, including proteins, fats, carbohydrates, vitamins, and minerals. Understand how fish diets differ based on their species (e.g., carnivorous, herbivorous, or omnivorous fish). Learn about the role of essential nutrients like	

omega-3 fatty acids in the health of fish.			
At the end of the course the student will be able to			Assessment
1	To become familiar with the subject, goals and objectives of the subject "Fish Feeding", as well as its connections with other sciences;		
2	To study scientific research methods of fish feeding and feeding technologies;		
3	Formation of ideas about the importance of live and artificial feeds in modern aquaculture, feeding and digestion processes, the structure of the digestive system of fish depending on feeding and biological characteristics, feed requirements, feed ratio and feed components;		
4	Formation of ideas about training tools		
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		Types of feeds and their importance in aquaculture.	
2		Feeding and digestion processes.	
3		The structure of the digestive system of fish.	
4		Fish feed requirements.	
5		Properties of feed components.	
6		Live baits and their importance.	
7		Livestock breeding technologies.	
8		The influence of external environmental factors on feeding and development of hydrobionts.	
9		Methods of preparing artificial (mixed) feeds.	
10		Assessment of the quality of mixed feeds.	

11		Methods of analyzing the quality of compound feeds.	
12		Aller Akva company and its feed products	
13		Feeding of carp.	
14		Feeding of goldfish.	
15		Feeding sturgeon.	
<p>Recommended Sources TEXTBOOK(S) Fish Nutrition" by John E. Halver & Randall W. Hardy "Aquaculture Nutrition: Fish and Crustaceans" by R. L. Morris, L. E. Timmons, and D. P. B. MacNeill "The Physiology of Fishes" by David H. Evans, James B. Claiborne, and Suzanne Currie "Nutrition and Feeding of Fish and Crustaceans" by David J. Sargent, David A. McEvoy, and Brian S. Tocher</p>			
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 water bio-resources and aquaculture, Department of “Natural sciences”.

course unit title	monitoring and research methods in aquaculture	
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)	3	
practice (hour/week)	2	
laboratory (hour/week)	-	
year of study	1	
semester when the course unit is delivered	2	
course coordinator	Ahmadova Konul Yaşar	
name of lecturer (s)	Ahmadova Konul Yaşar	
name of assistant (s)	-	
mode of delivery	full time	
language of instruction	english	
prerequisites	-	
recommended optional program components	-	
course description:		
<p>“the program of the subject of monitoring and research methodology in aquaculture provides information about marine organisms of azerbaijan, organisms of national importance living in inland and territorial water bodies of azerbaijan, their reproduction and breeding.</p> <p>the program will provide students with information about the main biotechnical stages of breeding organisms. stimulation of the maturation of reproductive products of producers by ecological, physiological and combination methods, collection of reproductive products by various methods. methods of fertilization of eggs taken from producers, their release from adhesion and placement in various types of incubation devices. types of incubation devices. working principle and technical characteristics of incubation devices. incubation of eggs after fertilization and formation of larvae. breeding of fish fry to a standard mass depending on the species.</p>		
objectives of the course: the aim of the course is to teach students innovative biotechnology for the artificial cultivation of critically important organisms in azerbaijan and the world. information will be provided on the scientific foundations of the efficient use of algae, mollusks and crustaceans as components of aquatic bioresources, and the technologies for their cultivation in natural and artificial water bodies.		
learning outcomes		
understanding aquaculture monitoring techniques		
outcome: learners will be able to describe various methods for monitoring water quality, fish health, and farm operations, such as water sampling, temperature monitoring, and oxygen levels.		
skills: ability to apply data loggers, sensors, and visual assessments for effective monitoring.		
at the end of the course the student will be able to		assessment
1	“formation of ideas about the goals and objectives of the discipline "aquaculture", scientific research methods, and its relationship with other sciences;	
2	formation of ideas about the biotechnical stages of modern freshwater and mariculture using innovative methods;	
3	formation of ideas about the means of 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		general summary about aquaculture	
2		main biotechnical stages of fish aquaculture	
3		sturgeon aquaculture	
4		aquaculture of goldfish	
5		aquaculture of cypriniformes	
6		aquaculture of perciformes	
7		pond farms and their characteristics	
8		land reclamation measures in aquaculture	
9		complex intensification measures in aquaculture	
10		cage aquaculture	
11		aquaculture in closed water supply systems	
12		cultivation of living organisms for fish feed	
13		breeding daphnia crustaceans	
14		cultivation of microalgae	
15		mariculture business forms and development prospects	
16		fish mariculture	
17		mariculture in lagoons, harbors and isolated areas	
18		mariculture of mollusks	
19		crustacean farming	
20		reproduction and cultivation of lobsters, crawfish, crabs	
21		mariculture of seaweed	
22		the importance of seaweed in agriculture and medicine	
23		acclimatization of hydrobionts and their importance in aquaculture	
recommended sources textbook(s)			
"aquaculture: principles and practices" by <i>t. v. r. pillay</i> (2008)			
"aquaculture engineering" by <i>odd-ivar lekang</i> (2013)			
"fish disease: diagnosis and treatment" by <i>edward j. noga</i> (2010)			

"aquaculture science" by <i>niels halberg, et al.</i> (2020)			
"ecology of aquatic systems" by <i>r. w. h. zonneveld</i> (1997)			
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 water bio-resources and aquaculture, Department of "Natural sciences".

Course Unit Title	Aquaculture of aquatic invertebrates
Course Unit Code	IF-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	Ahmadova Konul Yaşar	
Name of Lecturer (s)	Ahmadova Konul Yaşar	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
The course "Aquaculture of Aquatic Invertebrates" is one of the main fundamental biological subjects, which is taken by students in the third year of study. The material of this course covers almost all groups of aquatic invertebrates and provides extensive information about the roles of various animals in the biosphere at different stages of development and their importance in human life. 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 assist students in understanding this vast factual material with the help of various visual aids, and to acquire knowledge about the breeding methods and characteristics of aquatic invertebrates.		
Learning Outcomes		
Identify and classify various types of aquatic invertebrates, including their biological characteristics. Explain the life cycles of aquatic invertebrates and how they relate to aquaculture practices. Understand the ecological roles of aquatic invertebrates in aquatic ecosystems.		
At the end of the course the student will be able to		Assessment
1	To become familiar with the subject, goals and objectives of aquatic invertebrate aquaculture;	
2	As a result of studying the subject, acquire knowledge about the importance of aquatic invertebrates belonging to various systematic groups in the biosphere and human life;	
3	To acquire information about methods of breeding primary invertebrates;	
4	Study the ecology of each invertebrate group and take these factors into account when breeding.	
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. Breeding of crustaceans (crayfish)	
2		Cultivation of branchiate-legged animals	
3		Breeding Rotatoriums	
4		Cultivation of primordials	
5		Chironomid breeding	
6		Breeding of tubificides.	
7		Collection and cultivation of freshwater and land mollusks	
8		Rearing fly larvae	
9		Breeding of mealworms and enchytraeids	
10		Cultivation of worms and nematodes	
11		Rearing of adult insects (imago)	
12		Lobster, crawfish and crab farming	
13		Shrimp farming	
14		Breeding leeches	
15		Breeding of echinoderms	
Recommended Sources TEXTBOOK(S)			
<ol style="list-style-type: none"> Aquaculture: An Introduction <i>Authors: H. A. Hopkins & S. P. Williams (2020)</i> Aquaculture: Farming Aquatic Animals and Plants <i>Author: J. H. Tidwell (2012)</i> Aquaculture of Molluscs: A Practical Manual <i>Authors: M. J. Kaiser, A. D. Burnell, M. R. G. De Clavijo (2019)</i> Crustacean Farming: Ranching and Culture <i>Author: S. C. Y. Lin (2000)</i> Marine Shrimp Culture: Principles and Practices <i>Authors: L. J. P. A. S. V. Pillay & D. A. New (1990)</i> 			
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 water bio-resources and aquaculture, Department of “Ecology and

Course Unit Title	Labor protection
Course Unit Code	İF-B22
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	Amrahov Elshan Shirin
Name of Lecturer (s)	Amrahov Elshan Shirin
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
<p>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 that the number of nuclear fronts available, their danger 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 labor protection (safety of life in production) 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 technogenic and natural disasters.</p>	

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 peace and wartime. Emergency events that cause great material losses and human casualties (accidents at nuclear power plants, railways, enterprises using highly active substances, and frequent natural disasters, etc.) show that CD measures, especially in emergency situations of peace origin, should be reviewed and evaluated. This issue is of greater importance in market relations and transition periods. Civil defense of the Republic of Azerbaijan is a system of measures implemented by state authorities, legal entities and individuals to ensure the safety of the population and its territory in peace and war.

Learning Outcomes
Understanding of Legal and Regulatory Frameworks: Knowledge of national and international labor protection laws, regulations, and standards (e.g., OSHA in the U.S., ISO standards, or European Union regulations). Familiarity with workers' rights and employer responsibilities regarding health and safety.
Risk Assessment and Hazard Identification: Ability to identify potential hazards in various work environments (e.g., chemical, physical, biological, ergonomic, and psychosocial risks). Skills to assess risks and determine their likelihood and severity.

At the end of the course the student will be able to		Assessment
1	Formation of ideas about the teaching methodology, goals and objectives, scientific research methods, and relationship with other sciences of the subject of labor protection (safety of life activities in production);	
2	Formation of ideas about the means of training in labor protection (safety of life activities in production);	
3	Formation of ideas about the forms of organizing occupational safety (safety of life activities in production) training;	
4	Formation of ideas about the goals and objectives of the methodology for teaching the subject of labor protection (safety of life activities in production), scientific research methods, and its relationship with other sciences;	
5	Formation of ideas about the forms of organizing labor protection (safety of life activities in production) training;	
6	Formation of ideas about the principles and training methods of labor protection (safety of life activities in production);	
7	Formation of the ability to make logical judgments, draw conclusions and justify them.	
8	Formation of ideas about the teaching methodology, goals and objectives, scientific research methods, and relationship with other sciences of the subject of labor protection (safety of life activities in production);	

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;=ö0-	

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. Occupational safety and health, its purpose and the main issues it addresses.	
2		Topic No. 2. Theoretical foundations of labor protection. Psychological state of a person, factors affecting labor safety.	
3		Topic No. 3. Legal and organizational issues of labor protection.	
4		Topic No. 4. Organization of work on labor protection.	
5		Topic No .5. Industrial injuries and occupational diseases.	
6		Topic No. 6. Industrial sanitation. Microclimatic conditions in the workplace.	
7		Topic No. 7. Heating, ventilation, and lighting systems of buildings and hygienic requirements for them.	
8		Topic No. 8. Issues of protection against noise and vibrations.	
9		Topic No. 9. Occupational safety in schools and educational workshops.	
10		Topic No. 10. Occupational safety during work in laboratories and classrooms.	
11		Topic No. 11. Radiation protection issues.	
12		Topic No. 12. Electrical safety issues.	
13		Topic No. 13. Rules for first aid to injured persons.	
14		Topic No. 14. Combustion and fire hazardous properties of substances.	
15		Topic No. 15. Fire extinguishers, rules for working with them.	

Recommended Sources TEXTBOOK(S)

"Introduction to Occupational Health and Safety" by Bob O'Neill

"Occupational Safety and Health for Technologists, Engineers, and Managers" by David L. Goetsch

"Fundamentals of Occupational Safety and Health" by Mark A. Friend and James P. Kohn

"Risk Assessment: Theory, Methods, and Applications" by Graham S. Weiner

"Principles of Occupational Safety and Health" by Joseph A. DeFazio

"Safety Management: A Comprehensive Approach to Developing a Sustainable System" by Chester L. W. and Steven D. Scott

"The Safety Professional's Handbook" by Dan Petersen

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 water bio-resources and aquaculture, Department of “Ecology and environment”.

Course Unit Title	Civil Deferense
Course Unit Code	İF-B24
Type of Course Unit	Campulsory
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	Amrahov Elshan Shirin
Name of Lecturer (s)	Amrahov Elshan Shirin
Name of Assistant (s)	-
Mode of Delivery	Full Time
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: Mülki – Protection (PM) 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 (accidents at nuclear power plants, railways, enterprises using highly active substances, and frequent natural disasters, etc.) show that PM measures, especially in emergencies of peacetime origin, should be reviewed and evaluated. This issue is of greater importance in market relations and in the transition period. Civil defense of the Republic of Azerbaijan is a system of measures implemented by state authorities, legal entities and individuals to ensure the security of the population and its territory during peace and war.	
Learning Outcomes Develop the skills necessary to respond effectively to emergencies, including coordinating with emergency services (police, fire, medical teams) and managing resources. Learn the processes involved in crisis management, such as decision-making under pressure, communication strategies, and leadership during a disaster. Understand the role of civil defense organizations in both local and national emergency	

response frameworks.			
At the end of the course the student will be able to		Assessment	
1	Formation of ideas about the teaching methodology, goals and objectives, scientific and research methods, and relationship with other sciences of the Civil Defense subject;		
2	Formation of ideas about the means of training in Civil Defense;		
3	Formation of ideas about the forms of organizing civil-defense training;		
4	Formation of ideas about the goals and objectives of the teaching methodology of Civil - Defense, scientific research methods, and its relationship with other sciences;		
5	Formation of ideas about the forms of organizing MM training;		
6	Formation of ideas about the principles and training methods of MM training;		
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 the population in the field of protection from emergencies. Promotion of Civil Defense knowledge	
2		Classification of emergencies.	
3		Understanding 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 emergency situations.	
6		Basic principles and methods of population protection in emergency situations. Collective protection devices	

7		Relocation of population in emergency situations.	
8		Carrying out rescue and other urgent (Emergency and Disaster Management) tasks.	
Recommended Sources TEXTBOOK(S)			
"Introduction to Emergency Management" by George D. Haddow, Jane A. Bullock, and Damon P. Coppola			
"Disaster Policy and Politics: Emergency Management and Homeland Security" by Richard T. Sylvester			
"Principles of Emergency Management" by David A. McEntire			
"The Disaster Recovery Handbook" by Michael J. K. Thomas			
"Emergency Management: The American Experience" by Claire B. Rubin			
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 water bio-resources and aquaculture, Department of “Ecology and environment”.

Course Unit Title	Ecology	
Course Unit Code	İF-B13	
Type of Course Unit	Campulsory	
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 Javadova Leyla	
Name of Lecturer (s)	PhD Javadova Leyla	
Name of Assistant (s)	-	
Mode of Delivery	Full time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
The main task of the course - in the subject "Ecology" environmental factors and their impact on the body, environmental pollution and protection, modern environmental problems are studied. In addition, environmental pollution, solid, liquid and gaseous substances released into the environment, types of energy (heat, noise, radioactivity), their direct or indirect negative impact on people, animals, plants and industrial facilities are shown.		
Objectives of the Course: The main goal of the subject is to study the laws and principles of the interaction of biotic and abiotic components of the ecosystem. Here, the fundamentals of "Ecology" are studied - ecological factors, their classification and characteristics, the structure and components, functions and development of ecosystems, including forests. Sources of environmental pollution, methods of combating them, measures for neutralizing pollutants are studied. The structure and characteristics of various spheres (atmosphere, lithosphere and hydrosphere), main pollutants and sources of pollution are studied. Ecological problems of the Caspian Sea and measures for its protection are studied. Knowledge is gained about global ecological problems, their causes and ways of elimination, and specially protected natural areas.		
Learning Outcomes		
Define key ecological terms (e.g., ecosystem, biodiversity, food web, niche, succession). Describe the levels of ecological organization: individual, population, community, ecosystem, biome, and biosphere. Explain the flow of energy through ecosystems (e.g., trophic levels, food chains/webs)		
At the end of the course the student will be able to		Assessment
1	Formation of ideas about the history of the development of ecological science, the subject and tasks of the science of "Ecology";	
2	Formation of ideas about the interaction between environmental factors and organisms and, conversely, the impact of organisms on the environment;	
3	Formation of ideas about global environmental problems;	
4	Formation of ideas about the modern ecological state of natural environments: air, water and soil;	
5	Formation of ideas about specially protected natural areas and the main directions of international cooperation in the field of environmental protection;	

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 main purpose, importance and development history of ecological science	
2		Scientific teaching about the biosphere and its evolution	
3		Environmental factors	
4		Population concept. Population structure, density and biomass	
5		Anthropogenic pollution of the environment and its protection	
6		Artificial biocenosis or agrobiocenosis ecosystem	
7		Agricultural production and maintenance of ecological balance.	
8		Protection of the atmosphere.	
9		Ecosystem of the hydrosphere layer.	
10		The ecosystem of the lithosphere layer.	
11		Ecology of the plant world, its importance, composition, and distribution characteristics.	
12		Distribution, diversity and conservation of the animal kingdom.	
13		Ecosystem of seas and oceans	
14		Water pollution and protection	
15		Ecological problems of the Caspian Sea	
Recommended Sources TEXTBOOK(S)			
<ul style="list-style-type: none"> - "Ecology: The Economy of Nature" – Robert E. Ricklefs & Rick Relyea <i>A foundational text covering all major topics with strong visuals and data-driven examples.</i> - "Elements of Ecology" – Thomas M. Smith & Robert Leo Smith <i>Widely adopted for its accessibility and coverage of applied ecology topics.</i> - "Ecology" – Michael L. Cain, William D. Bowman, & Sally D. Hacker <i>Emphasizes experimental approaches and integrates modern ecological research.</i> - "The Ecology of Plants" – Jessica Gurevitch, Samuel M. Scheiner & Gordon A. Fox <i>A specialized text focusing on plant ecology.</i> 			
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 water bio-resources and aquaculture, Department of “Mechanics and mathematics”.

Course Unit Title	Math
Course Unit Code	IF-B02
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 Guliyeva Svetlana

Name of Lecturer (s)	PhD Guliyeva Svetlana	
Name of Assistant (s)	-	
Mode of Delivery	Face to face	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
In the higher mathematics course, topics are taught in the sections of the subject "Mathematics": "Linear algebra and elements of mathematical analysis", "Differential and integral calculus of functions with one variable", "Analytical geometry", "Probability theory", "Mathematical statistics", and students are taught the basic concepts of the subject and mastered basic knowledge. These, in turn, play an important role in teaching other subjects. The course consists of theoretical and seminar lessons. Here, the application of all theorems and properties is reflected in practical exercises.		
Objectives of the Course: The purpose of the subject is to improve the level of fundamental mathematical preparation of students and to instill the skills to apply the knowledge they have acquired to various areas of economics. During the teaching of the subject, students are taught the basic postulates of probability theory (classical, statistical and geometric definitions of probability). Information is provided about the compliance of the probabilities of occurrence of random events with various laws. The compliance of random quantities, which quantitatively express the considered random event, with the laws of distribution and the ways of their application to practical areas are investigated.		
Learning Outcomes		
Algebra: Solve equations and inequalities; analyze and interpret functions (linear, quadratic, exponential).		
Geometry: Understand and apply theorems involving angles, triangles, circles, and transformations.		
Trigonometry: Explore the relationships in right and non-right triangles; understand sine, cosine, and tangent.		
Statistics: Interpret data, use statistical models, and understand correlation vs. Causation.		
At the end of the course the student will be able to		Assessment
1	The methodology of teaching mathematics explains the goals and objectives of the science, scientific research methods, and its relationship with other sciences.	
2	Distinguishes the forms of organizing mathematics instruction, identifies and applies the form appropriate to the topic.	
3	Interprets and explains the tools of mathematics teaching, identifies and selects visual aids for a specific lesson.	
4	Makes logical judgments, draws conclusions, and justifies them	
5	Interprets and explains the principles and teaching methods (technologies) of mathematics teaching	
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 matrix, operations on matrices. Two- and three-order determinants. Minor and algebraic complements.	
2		System of linear equations. Cramer's formulas.	
3		The concept of function. Classification of functions. Basic elementary functions. Limit of a sequence and a function, basic theorems. Notable limits.	
4		Infinitely increasing and infinitely decreasing functions. Discontinuity of a function at a point and on a segment, properties. Classification of points of intersection.	
5		Derivative of a function, geometric and mechanical meaning. Derivative table. Derivative of complex functions. Differential of a function, properties. Higher-order derivatives and differentials.	
6		Basic theorems of differential calculus. Application of the derivative. L'opital's rule. Theorems about the extrema of a function and their existence.	
7		The concept of an elementary function. Indefinite integral, properties. Table of integrals. Integration methods: substitution of variables, integration by parts.	
8		Definite integral, properties and geometric meaning. Newton-Leibniz formula. Substitution of a variable in a definite integral and methods of integration by parts.	
9		Basic concepts of probability theory. Various definitions of probability. Combination theory and its applications.	
10		Sum, difference, and product of events. Conditional probability, probability multiplication, and addition theorems. Probability of at least one event occurring.	
11		Complete probability formula. Bayes' formula. Independent tests. Bernoulli's formula. Most likely number.	
12		Random quantities. The law of distribution of discrete random quantities. Numerical characteristics of discrete random quantities.	
13		Distribution function. Density function. Numerical characteristics of continuous random variables. Discrete and continuous distributions. Binomial distribution. Regular distribution. Normal distribution.	
14		Subject of mathematical statistics. Primary and sample collection. Types of sampling. Variation order. Polygon and histogram. Empirical distribution function.	
15		Numerical characteristics of the sample. Sample mean, variance, mean squared tendency, coefficient of variation.	
Recommended Sources TEXTBOOK(S)			
- "The Man Who Knew Infinity" – Robert Kanigel <i>Biography of mathematician Srinivasa Ramanujan.</i>			

<ul style="list-style-type: none"> - "Fermat's Enigma" – Simon Singh <i>The story behind the solving of Fermat's Last Theorem.</i> - "The Joy of x" – Steven Strogatz <i>Explains math concepts in real-life contexts.</i> - "In Pursuit of the Unknown: 17 Equations That Changed the World" – Ian Stewart <i>Explores the impact of major equations in history.</i> - "How Not to Be Wrong: The Power of Mathematical Thinking" – Jordan Ellenberg <i>Shows how math shapes everyday decisions and reasoning.</i> 			
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 water bio-resources and aquaculture, Department of "Mechanics and mathematics".

Course Unit Title	Statistics
Course Unit Code	IF-B20
Type of Course Unit	Campulsory
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 Guliyeva Svetlana
Name of Lecturer (s)	PhD Guliyeva Svetlana
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: The "mathematical statistics" course, intended for undergraduate students, covers topics such as discrete and continuous random variables and their mathematical expectation, variance and mean squared tendency, initial and central moments, statistical distribution of sampling, frequency and relative frequency, initial and sample collection, evaluation of their numerical characteristics, confidence interval, and so on.	
Objectives of the Course: The goal of the course is to develop the mathematical thinking of future graduates, to instill in them the ability to conduct mathematical analysis of observations and results, and to make appropriate predictions.	
Learning Outcomes Understanding of Statistical Concepts Descriptive Statistics: Ability to summarize and describe key characteristics of data, including measures of central tendency (mean, median, mode) and dispersion (range, variance, standard deviation). Inferential Statistics: Understanding how to make predictions or generalizations about a population based on a sample, including hypothesis testing, confidence intervals, and p-values.	
At the end of the course the student will be able to	
1	Developing students' intellectual potential and increasing their ability to use mathematical methods in their future activities.
2	Data Collection and Experimental Design Understanding the importance of good experimental design, including random sampling, random assignment, and controlling for confounding variables. Knowledge of different data collection methods (surveys, experiments, observational studies) and their implications for data analysis.
3	Probability Theory Grasp of probability concepts, including events, sample spaces, conditional probability, and Bayes' theorem. Understanding probability distributions (e.g., normal, binomial, Poisson) and their applications.
4	Statistical Software Proficiency Ability to use statistical software (such as R, SPSS, Excel, or Python libraries like Pandas and NumPy) for data analysis and visualization. Ability to perform data manipulation, hypothesis testing, regression analysis, and interpretation of results using statistical software.
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		Basic concepts of probability theory. Events and actions on them	
2		Classical and statistical definitions of probability. Simple properties of probability	
3		Independent events. Conditional probability. Multiplication theorem	
4		The probability of at least one event occurring. Absolute probability. Bayes's formula. Bernoulli's formula	
5		Random quantities. The law of distribution of discrete random quantities. Mathematical expectation. Variance and its properties	
6		Continuous random variables, Distribution and density function, Numerical characteristics	
7		Continuous distributions and their numerical characteristics. Regular distribution. Exponential distribution.	
8		Primary and sample sets. Empirical distribution function	
9		Polygon, Histogram	
10		Value of distribution parameters	
11		The method of greatest similarity to the truth	
12		Interval estimation of distribution parameters	
13		Correlation dependence.	
14		Selection equation of a regression straight line	
15		Statistical assumptions	
Recommended Sources TEXTBOOK(S)			
<ol style="list-style-type: none"> 1. "Statistics for Business and Economics" by Paul Newbold, William L. Carmines, and William. J. Hoaglin 2. "The Essence of Statistics: A Guide to the Application of Statistical Methods" by David L. Hildenbrand 3. "Introductory Statistics" by Neil A. Weiss 4. "Statistics: A Tool for Social Research" by Joseph F. Healey 5. Intermediate and Advanced Statistics 6. "Applied Multivariate Statistical Analysis" by Richard A. Johnson and Dean W. Wichern 			

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 water bio-resources and aquaculture, Department of “School of Economics and Business”.

Course Unit Title	Economics, marketing and management of the field
Course Unit Code	IF-B23
Type of Course Unit	Compulsory
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	4
Semester when the course unit is delivered	1
Course Coordinator	Pashayev Amirkhan
Name of Lecturer (s)	Pashayev Amirkhan
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: This interdisciplinary course explores the fundamental principles of economics, marketing, and management as they apply to a specific professional or industrial field. Students will gain an understanding of how economic theories influence decision-making, how marketing strategies are developed and implemented, and how effective management practices drive organizational success.	
Objectives of the Course: The course emphasizes practical applications through case studies, industry analysis, and project-based learning. Students will learn to analyze market structures, assess consumer behavior, develop marketing plans, and apply strategic management principles in real-world contexts.	
Learning Outcomes: Understand and apply core economic principles such as supply and demand, market structures, and economic indicators relevant to the field. Analyze market conditions and consumer behavior to identify opportunities and challenges in various economic environments. Develop effective marketing strategies including market segmentation, targeting, positioning, and the marketing mix (product, price, place, promotion).	
At the end of the course the student will be able to	
1	Evaluate and implement management theories and practices that enhance organizational performance, leadership, and decision-making.
2	Integrate economic and marketing insights to optimize resource allocation and improve business outcomes.
3	Apply financial management tools to budget, forecast, and manage costs within an organization.
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		Topic No. 1. Basic provisions of the project	
2		Topic No. 2 Management concept	
3		Topic No. 3. Project and project forms in marketing	
4		Topic No. 4. Manager concept, time management and managerial skills	
5		Topic No. 5.. Illustration of the main works in the quality management system	
6		Topic No. 6. Investment project management	
7		Topic No. 7. Personnel management, work and activity	
8		Topic No. 8. Human resources planning.	
9		Topic No. 9. Communication in the management system	
10		Topic No. 10. Economic risks	
11		Topic No. 11. Economic risk management	
12		Topic No. 12. Cost management	
13		Topic No. 13. Assessment of the complexity of the work	
14		Topic No. 14. Automated design systems	
15		Topic No. 15. Management ecology	
Recommended Sources TEXTBOOK(S) 1. Menecmentin (idarəetmənin) əsasları. T.Quliyev, Bakı 2012; 2. Menecmentin əsasları. X.M.Yahudov, Bakı 2007; 3. Menecment. Ə.Ələkbərov, F.İbrahimov Bakı 2004; 4. İqtisadiyyatın idarə edilməsi. T.Mirzəyev, Bakı 2006; 5. Menecmentin əsasları. Vixanskiy, 1998;			
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 water bio-resources and aquaculture, Department of “Mechanics and mathematics”.

Course Unit Title	Biophysics
Course Unit Code	ATMF -B11
Type of Course Unit	Compulsory
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	PhD Salimov Ilham
Name of Lecturer (s)	PhD Salimov Ilham
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	
Understand Fundamental Concepts: Demonstrate understanding of basic physical principles	

(mechanics, thermodynamics, electromagnetism, quantum physics) as they apply to biological systems.
Apply Quantitative Methods: Use mathematical and computational tools to analyze biological structures and processes.

Integrate Physics and Biology: Explain how physical laws govern the behavior of molecules, cells, tissues, and organisms.

Analyze Biological Systems: Model and interpret phenomena such as molecular diffusion, membrane transport, electrical activity in neurons, and biomechanics.

At the end of the course the student will be able to		Assessment
1	An important aspect of physics lectures is that physical experiments should be conducted in real and computer environments, educational films, and model computer programs should be used.	
2	As a rule, seminars cover theoretical materials that require complex mathematical apparatus and various methods for solving problems.	
3	Students may receive various types of homework assignments to reinforce the material learned in seminars.	
4	They will gain practical understanding of 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 its 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. The influence of microclimate on the human body. The mechanism of temperature change in the human body. The influence of the gravitational field on biological objects	
3		Structure of biological membranes. Modern concepts of the structure of biological membranes. 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. Population growth model. Reasons for population decline. Predator-Prey model	
6		Specific physical fields of a person. Biological effects of electric current. Electrotherapy. Direct current in biological objects. Physiological effects of direct current. Biological effects of alternating current. Electrical properties of body tissues. Electric field of the human body. Effects of alternating electric field on biological objects. Effects of impulse current on biological objects. Physical fields of a person and extrasensory perception	
7		The effect of the magnetic field on the human body. Physiological mechanisms of the magnetic field. Mechanisms of therapeutic action of the magnetic field. The effect of the magnetic field on biological objects. The specific electromagnetic field of the human body. The mechanism of action of the magnetic field. The effect of the 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 impact on the human body. General scheme of photosynthesis. The mechanism of photosynthesis and its phases. General scheme of photosynthesis. The mechanism of action of chlorophyll in the process of photosynthesis	
10		Types of photochemical reactions. Luminescence 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 basis of vision. The eye and its optical power. Biophysics of vision	
11		The phenomenon of the photoelectric effect and its role in human life. Photon and its properties. The process of light absorption. The role of light dispersion in human life. Infrared and ultraviolet radiation. Physical properties of laser radiation. Biological effects of laser radiation	

12		Electromagnetic nature of light. Biological effect of optical radiation. Energy characteristics of light. Effect of light sources on the human body. Effect of electromagnetic radiation in the optical range on biological objects. Effect of electromagnetic field on living organisms. Biomechanism of the mechanism of action of electromagnetic waves on humans. The specific electromagnetic field of the human body	
13		About muscles and muscle activity. About muscle tension. Inactive tension of muscles. 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	
14		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 vesselsHydrodynamics of an ideal fluid. Physical properties of blood. Dynamics of blood movement in capillaries	
15		Biomechanism of blood flow in arteries and veins. The functioning of the heart as a mechanical system. Biophysics of blood pressure. Hydrodynamics of viscous fluid. The heart as a mechanical system. Distribution of mean pressure in the vessels. Biophysics of the pulse wave	

Recommended Sources TEXTBOOK(S)

1. **"Biophysics: An Introduction"** – *Roland Glaser*
A solid, student-friendly introduction to the field, covering the physical principles behind biological systems.
2. **"Physical Biology of the Cell"** – *Rob Phillips, Jane Kondev, Julie Theriot, Hernan Garcia*
A modern, integrated approach linking physics, biology, and quantitative analysis.
3. **"Biophysics: Searching for Principles"** – *William Bialek*
Offers conceptual clarity and mathematical insight into biological phenomena.
4. **"Intermediate Physics for Medicine and Biology"** – *Russell K. Hobbie & Bradley J. Roth*
Covers applications of physics in medicine and biology with problem sets.

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 water bio-resources and aquaculture, Department of “English Philology”.

Course Unit Title	Academic writing and reading
Course Unit Code	ATMF-BO1
Type of Course Unit	Compulsory
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:	<p>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.</p> <p>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 skill</p>
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

Clarity and Coherence:

Demonstrate the ability to write clear, focused, and organized essays or research papers.
Use appropriate transitions and structure to ensure logical flow of ideas.

Argumentation and Analysis:

Construct well-supported arguments using relevant evidence from credible sources.
Analyze and critically engage with texts to synthesize information and form reasoned conclusions.

Academic Style and Tone:

Write in a formal, objective, and academic tone, avoiding informal language and personal bias.
Demonstrate proficiency in using academic conventions, including correct grammar, punctuation, and vocabulary.

Source Integration and Citation:

Effectively integrate quotes, paraphrases, and summaries from scholarly sources.
Accurately cite sources in accordance with a recognized citation style (e.g., APA, MLA, Chicago).

At the end of the course the student will be able to		Assessment
1	Forms the ability to rationally approach the history of ethical thought; modern approaches to the study of ethical knowledge create a complete picture of the essence of morality and classify its main functions	
2	Emphasizes the importance of maintaining objectivity in the study of the history of ethical thought	
3	Application of acquired theoretical knowledge in professional and daily 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 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		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)

- **"They Say / I Say: The Moves That Matter in Academic Writing" by Gerald Graff and Cathy Birkenstein**
- A highly practical guide for writing academically, focusing on how to frame arguments and engage with existing scholarship effectively.
- **"The Elements of Style" by William Strunk Jr. and E.B. White**
- A classic on clear and concise writing, focusing on grammar, style, and composition rules for effective communication.
- **"Writing for Social Scientists: How to Start and Finish Your Thesis, Book, or Article" by Howard S. Becker**
- A book offering practical advice on academic writing for researchers and graduate students, including tips on overcoming procrastination and writer's block.
- **"A Rulebook for Arguments" by Anthony Weston**
- A concise guide to constructing logical, sound arguments and understanding the fundamentals of argumentation in writing.
- **"The Craft of Research" by Wayne C. Booth, Gregory G. Colomb, and Joseph M. Williams**
- This book offers a step-by-step guide to writing research papers and developing a strong argument based on evidence.

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Water toxicology
Course Unit Code	ATMF -B03
Type of Course Unit	Selective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	3
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Abdullayeva Reykhan Kamil qızı
Name of Lecturer (s)	Abdullayeva Reykhan Kamil qızı
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: Aquatic toxicology – studies the effects of anthropogenic and natural activities, chemicals, and materials on living organisms at various levels of organization, from the cellular level to the population and ecosystem.	
Objectives of the Course: 1. Know the classification of different groups of toxic substances that pose a threat to aquatic organisms 2. Know the characteristics of the concepts of acute and chronic toxicity 3. Know the mechanisms of transfer routes of toxic substances to organisms 4. Understand the mechanisms of absorption and accumulation of toxins	
Learning Outcomes Understanding of Waterborne Pollutants Identify various types of water contaminants (e.g., heavy metals, pesticides, pharmaceuticals, industrial chemicals, microorganisms). Explain the sources and pathways of water pollution. Describe the role of water in the distribution of toxic substances. Impact on Human Health Analyze how toxic substances in water affect human health, including acute and chronic effects. Discuss specific diseases and disorders linked to water pollution (e.g., gastrointestinal diseases, cancer, neurological damage). Evaluate the risk assessment process for human exposure to waterborne toxins. Environmental Impact Examine how water contaminants impact aquatic ecosystems (e.g., bioaccumulation, food chain disruption, toxicity to aquatic organisms). Understand the ecological effects of pollutants on biodiversity, habitat destruction, and water quality.	

Assess the role of water quality monitoring in understanding and mitigating environmental impacts. Toxicokinetics and Toxicodynamics Explain the processes of absorption, distribution, metabolism, and excretion (ADME) of waterborne toxins in living organisms. Discuss the mechanism of action of different toxins in the body. Apply concepts of dose-response and toxicological thresholds to water toxicology.			
At the end of the course the student will be able to			Assessment
1	Be able to distinguish the main types of toxins that can be found in water		
2	To understand the differences between acute and chronic toxicity caused by toxins		
3	Understand the transfer routes of toxic substances into the body, as well as the mechanisms of accumulation in the body		
4	Understand the principles of toxicological analyses.		
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 subject and history of development of toxicology	
2		Classification of toxic substances. Factors determining toxicogenicity	
3		Acute and chronic toxicity. Determination of toxicity	
4		Combined effect of toxic substances: synergism, antagonism. Types and stages of poisoning. Adaptation of hydrobionts to toxic substances	
5		Plant toxins and their classification	
6		Animal toxins and their classification	
7		Mycotoxins and their mechanisms of action	
8		Metal toxins and their mechanism of action	
9		Source of water pollution: mining of metal deposits	

10		Water Pollution: Oil Spills, Consequences, and Cleanup Methods	
11		Water pollution: Heavy and light industrial waste	
12		Sources of pollution of water bodies: Pesticides, herbicides, their routes of entry into water bodies and mechanisms of action	
13		Wastewater treatment methods	
14		Effects of water pollution on living organisms: genotoxicology and immunotoxicology	
15		Effects of water pollution on living things: Disruptions in the endocrine system	
16		Effects of water pollution on living organisms: Physiological effects on the organism	
17		Distribution and accumulation of toxic substances in running and stagnant waters	
18		Ways of transferring toxic substances into the body	
19		Biomarkers and their classification	
20		Self-purification processes in natural water bodies	
21		Ecological aspects of aquatic toxicology	
22		Absorption of toxic substances	
23		Absorption of toxic substances	
<p>Recommended Sources TEXTBOOK(S)</p> <p>"Water Quality and Treatment: A Handbook on Drinking Water" by Bruce E. Larock, American Water Works Association A comprehensive resource for understanding drinking water quality, including treatment processes and how toxic substances can affect water safety.</p> <p>"Principles of Environmental Toxicology" by Alan L. W. W. Provides foundational knowledge on environmental toxicology, including the behavior of pollutants in water and their toxic effects on ecosystems.</p> <p>"Environmental Toxicology: Biological and Health Effects of Pollutants" by Ming-Ho Yu This book details the biological mechanisms and health effects of various pollutants in water, making it an essential resource for toxicological studies.</p> <p>"Aquatic Toxicology and Hazard Assessment" by John F. McCarthy and Leo N. K. M. Lee Focuses on aquatic toxicology, examining both individual chemicals and general water pollution, with real-world applications and case studies.</p>			
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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Hydromorphology
Course Unit Code	ATMF -B03
Type of Course Unit	Selective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	3
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Abdullayeva Reyhan Kamil
Name of Lecturer (s)	Abdullayeva Reyhan Kamil
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
Hydromorphology is a scientific field that studies the morphological and hydrodynamic characteristics of water bodies (rivers, lakes, seas, etc.), the patterns of their formation and development. This field is located at the intersection of hydrology and geomorphology and studies the relationship between the physical structure of water bodies and their flow regime.	
Objectives of the Course:	
The main goal of hydromorphology is to study the morphological structure and hydrodynamic properties of water bodies (rivers, lakes, seas, and other water bodies), to determine the patterns of development of these systems, and to investigate their changes under natural and anthropogenic influences.	

Learning Outcomes			
Define key terms such as hydrology, geomorphology, and hydromorphology. Explain the importance of hydromorphology in freshwater ecosystem health and river basin management. Describe the main hydrological and morphological processes shaping river channels and floodplains. Understand sediment transport dynamics and flow regimes.			
At the end of the course the student will be able to		Assessment	
1	Analyze the geomorphological and hydrodynamic characteristics of water bodies.		
2	Study the impact of hydromorphological processes on aquatic ecosystems and the environment.		
3	To assess the changes caused by hydraulic structures and human activities in water basins.		
4	To provide scientific justifications for the sustainable management and protection of water resources.		
5	Analyze and predict the impact of climate change on water bodies.		
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 hydromorphology.	
2		Principles of formation and development of water basins	
3		River hydromorphology	
4		Rivers in Azerbaijan and their hydromorphology	
5		Hydromorphology of lakes	
6		Hydromorphology of reservoirs	
7		Marine and coastal hydromorphology	
8		Anthropogenic impacts and hydromorphological changes	
9		Impact of hydraulic structures (dams, reservoirs, etc.)	
10		Impact of deforestation and land use on hydromorphological indicators	
11		Climate change and its impact on hydromorphology	

12		Hydromorphological research methods. Hydromorphological mapping and modeling	
13		Remote sensing and GIS applications. Laboratory and field research methods	
14		The role of hydromorphology in water resources management	
15		River basin management	
16		Sustainable use and protection of water resources	
17		Hydromorphological rehabilitation measures	
18		Modern problems and research directions in hydromorphology	
19		Hydromorphological risk assessment	
20		Global climate change and changes in watersheds	
21		Current hydromorphological risks and preventive measures in the river basins of Azerbaijan.	
22		Current hydromorphological risks in the Caspian Sea and their prevention	
23		Future research perspectives of hydromorphology	

Recommended Sources TEXTBOOK(S)

1. **Knighton, D. (2014).** *Fluvial Forms and Processes: A New Perspective*
– A foundational book on river morphology, processes, and forms.
2. **Charlton, R. (2007).** *Fundamentals of Fluvial Geomorphology*
– Offers an accessible introduction to fluvial systems and sediment dynamics.
3. **Gurnell, A. & Petts, G. (1995).** *Changing River Channels*
– Discusses channel changes in response to natural and anthropogenic factors.
4. **Bridge, J.S. (2003).** *Rivers and Floodplains: Forms, Processes, and Sedimentary Record*
– A more advanced look at river processes and sedimentology.

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 water bio-resources and aquaculture, Department of “Ecology and environment”.

Course Unit Title	Methods for calculating damage to water basins
Course Unit Code	ATMF -B05
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	t.e.d. Ağazade Alasgar Dadash oğlu
Name of Lecturer (s)	t.e.d. Ağazade Alasgar Dadash oğlu
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
<p>When water is used in a complex way, it is used for several purposes at the same time. An example of this is the Mingachevir water junction in Azerbaijan, which combines energy, irrigation, water supply, fisheries, shipping, and flood control. The complex use of water resources requires the regulation of river flow. Because at different times there has been a discrepancy between the flow of the river and demand. To eliminate this discrepancy, the river flow is regulated, a reservoir is created, excess water in the river is collected there and used during periods of water shortage. This creates a favorable basis for the complex use of water resources.</p>	
Objectives of the Course:	
<p>Management as a process leading to set results and goals is a purposeful activity aimed at organizing mutual relations between the structures of the management system. Water resources are one of the main parts of the biosphere, therefore, it is necessary to approach water resources management from an ecological point of view, because the science of ecology teaches the relationship of biological objects with the environment and is the basis for the efficient use of nature. An artificial system created for the purpose of using water should also operate on the principle of a natural system, that is, it should not</p>	

allow water resources to be polluted or depleted. For this purpose, the engineering-ecological direction should be given priority in the complex use of water resources. A vivid example of such a direction is the use of waste-free technological processes in production.

Learning Outcomes

Define key terms: water basin, ecological damage, hydrological alteration, pollution load, erosion, and sedimentation. Explain the natural and anthropogenic causes of damage to water basins (e.g., deforestation, mining, urban runoff, dam construction). Distinguish between physical, chemical, and biological damage to basin ecosystems. Recognize key indicators of basin health and degradation (e.g., turbidity, nutrient levels, flow regime changes, biodiversity loss).

At the end of the course the student will be able to		Assessment
1	Formation of ideas about the history, subject and tasks of the development of ecological law;	
2	Implementation of ecological control and ecological expertise, suspension or restriction of the activities of environmentally harmful production and service providers, imposition of administrative penalties, filing lawsuits before the courts;	
3	Formation of ideas about specially protected natural areas and the main directions of international cooperation in the field of environmental protection;	
4	Formation of ideas about global environmental problems;	
5	Formation of ideas about the modern ecological state of natural environments: air, water and soil;	

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		Water resources and their quality characteristics	
2		Water management complex and their characteristics	
3		Protection from flooding in watershed areas	
4		Composition and properties of natural waters, chemical processes occurring in this environment	
5		Types and sources of water pollution. Radioactive pollution.	

6		The main problems of industrial water treatment and the main methods used	
7		Treatment of industrial water	
8		Types and sources of water pollution	
9		Protection of water resources is a guarantee of ecosystem security	
10		Use of water resources	
11		Wastewater treatment methods	
12		Main physicochemical methods for industrial wastewater treatment	
13		Mass exchange processes in wastewater treatment technologies	
14		Kinetic and mass transfer methods of water source purification process by extraction method	
15		Removal of pollutants from the environment into water bodies	

Recommended Sources TEXTBOOK(S)

1. **Maidment, D. R. (Ed.). (1993).** *Handbook of Hydrology*
– A foundational reference for hydrological processes and modeling techniques, including basin-scale analysis.
2. **Dingman, S. L. (2015).** *Physical Hydrology (3rd ed.)*
– Detailed explanation of hydrological cycles and watershed processes relevant for damage assessments.
3. **Wheater, H., & Evans, E. (2009).** *Land Use, Water Management and Future Flood Risk*
– Discusses how land use and management affect water basin dynamics and damage potential.
4. **Barbier, E. B. (2007).** *Valuing Ecosystem Services as Productive Inputs*
– Focus on economic valuation methods of environmental degradation, applicable to basins.
5. **de Groot, R. et al. (2002).** *A typology for the classification, description and valuation of ecosystem functions, goods and services.*
– *Ecological Economics*, 41(3), 393–408.
6. **Arnold, J. G., Srinivasan, R., et al. (1998).** *Large area hydrologic modeling and assessment part I: Model development.*
– *Journal of the American Water Resources Association*, 34(1), 73–89. (SWAT model basis)

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 water bio-resources and aquaculture, Department of “Ecology and environment”.

Course Unit Title	Effective use of nature
Course Unit Code	ATMF -B05
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	PhD Agazade Alasgar Dadash
Name of Lecturer (s)	PhD Agazade Alasgar Dadash
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: The goal of the "Ecology and Efficient Use of Nature" course is to provide a more accurate understanding of the nature and value of natural resources for society, and to provide information on ways to use them without leading to their depletion.	
Objectives of the Course: By taking this course, students will become familiar with ecology, the environment, and the ways to use, properly manage, and preserve natural resources.	
Learning Outcomes Define key concepts: sustainability, ecosystem services, conservation, and ecological balance. Explain the relationship between natural resources and human well-being. Distinguish between renewable and non-renewable resources (e.g., water, soil, forests, minerals). Analyze the responsible use of nature in	

agriculture, forestry, fishing, and energy production.			
At the end of the course the student will be able to			Assessment
1	Development of ecological science;		
2	Goals and objectives of nature use;		
3	Main directions of nature use in the Republic of Azerbaijan		
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 development of ecological science	
2		Goals and objectives of nature use, scientific and theoretical foundations	
3		The interaction between natural conditions and social appropriation	
4		Natural resources and their classification	
5		Issues of efficient use of natural resources	
6		Socio-ecological problems of nature use	
7		Main directions of nature use in the Republic of Azerbaijan.	
8		Land, water and recreational resource use and problems	
9		Socio-geographical and ecological problems of bioresource use	
10		Protection of Azerbaijan's mineral resources	
11		Distribution and efficient use of the world's water resources	
12		Ecogeography of soils and its protection	
13		The importance of the plant world, their local and global problems	
14		The importance of international organizations in wildlife conservation	
15		Minerals, uses and problems	
Recommended Sources TEXTBOOK(S)			
1. Daily, G. C. (Ed.). (1997). <i>Nature's Services: Societal Dependence on Natural Ecosystems</i>			
2. Miller, G. T., & Spoolman, S. (2022). <i>Living in the Environment (20th ed.)</i>			
3. Meffe, G. K., et al. (2002). <i>Ecosystem Management: Adaptive, Community-Based Conservation</i>			
4. Chapin, F. S., et al. (2011). <i>Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World</i>			

5. Brown, L. R. (2009). <i>Plan B 4.0: Mobilizing to Save Civilization</i>			
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 water bio-resources and aquaculture, Department of “Ecology and environment”.

Course Unit Title	Water basins of Azerbaijan
Course Unit Code	ATMF -B02
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	t.e.d. Aghazade Elesger Dadash oğlu	
Name of Lecturer (s)	t.e.d. Aghazade Elesger Dadash oğlu	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
<p>“The purpose of the "Water Basins of Azerbaijan" course is to provide information on creating conditions for reducing negative impacts on the environment and preserving natural resources in water basins, water management, energy, land reclamation, water supply and sanitation, fisheries development, water transport, etc. processes.</p>		
Objectives of the Course:		
By taking this course, students will become familiar with water bodies and their quality, as well as the integrated use and protection of water resources.		
Learning Outcomes		
Identify and locate the main water basins of Azerbaijan, including the Kura-Aras Basin and the Caspian Sea Basin. Describe the physical features of Azerbaijan’s major rivers, lakes, and water systems. Explain the importance of water basins for Azerbaijan’s agriculture, energy, and daily water supply. Discuss the environmental issues affecting water basins, such as pollution, water scarcity, and climate change.		
At the end of the course the student will be able to		Assessment
1	Water basins and their quality characteristics;	
2	Integrated water resources management and its principles;	
3	Ecology and protection of water bodies	
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 water resources and their quality	
2		Water reserves in reservoirs	
3		Water reserves in reservoirs	
4		Water resources in lakes	
5		Water resources in lakes	
6		Water resources in rivers	
7		Water resources in rivers	
8		Transboundary rivers, waterfalls, groundwater, glaciers	
9		Mineral waters, thermal waters	
10		Caspian Sea	
11		Water management complex and their characteristics	
12		Hydropower. Water transport, deforestation and recreation. Fisheries.	
13		Integrated water resources management and its principles	
14		Water resources protection	
15		Water legislation, rules for the use of water resources and its management	

Recommended Sources TEXTBOOK(S)

Books & Academic Papers:

1. *Hydrology and Water Resources of Azerbaijan*
Author: [Look for publications by Azerbaijani hydrologists or regional water experts]
2. A detailed study of Azerbaijan's river basins, hydrology, and water resource management.
3. Mammadov, A., & Aliyev, R. (2018). *Water Resources and Environmental Challenges in Azerbaijan*.
4. Discusses water availability, quality, and environmental issues affecting water basins.
5. Aliyev, N. (2016). *The Kura and Aras Rivers: Transboundary Water Management in the South Caucasus*.
6. Focuses on the geopolitical and environmental aspects of Azerbaijan's main rivers.
7. UNESCO Reports on Water Resources in the South Caucasus (including Azerbaijan)
8. Useful for understanding regional water basin management and challenges.

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 water bio-resources and aquaculture, “Department of Natural sciences”.

Course Unit Title	Water pollution and its control
Course Unit Code	ATMF -B02
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	Ahmedova Könül Yashar
Name of Lecturer (s)	Ahmedova Könül Yashar
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
The subject "Water Pollution and Its Control" studies the sources of pollution of water bodies (domestic, industrial, agricultural, etc.), the physical, chemical and biological properties of pollutants, their distribution and decomposition mechanisms in the aquatic ecosystem. The subject also provides knowledge about wastewater treatment methods (mechanical, biological and chemical treatment), water quality assessment methods and monitoring systems. Students also become familiar with modern approaches and environmental policy related to the prevention of water pollution and the protection of existing water resources.	
Objectives of the Course: This subject aims to provide students with extensive information about the causes of water resource pollution, types of pollutants, their effects on the ecosystem and human health, water pollution control methods, and purification technologies.	
Learning Outcomes	
Define water pollution and identify its major types (e.g., chemical, biological, physical). Explain the sources of water pollution, including point and non-point sources.	

Describe the effects of water pollution on human health, aquatic life, and the environment. Identify common pollutants found in water bodies (e.g., heavy metals, pathogens, nutrients).			
At the end of the course the student will be able to		Assessment	
1	They will be able to explain the main causes and consequences of water pollution.		
2	They will understand water purification technologies and their application areas		
3	They will be able to assess pollution risks and suggest control measures.		
4	They will be able to make recommendations for the protection and sustainable use of water resources.		
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		Importance and classification of water resources	
2		Water pollution: concept, types and main sources	
3		Domestic wastewater and its composition	
4		Industrial pollution and specific pollutants	
5		Agricultural pollution: pesticides and fertilizers	
6		Biological contamination and the role of microorganisms	
7		The impact of water pollution on ecosystems	
8		Human health impacts and waterborne diseases	
9		Water quality assessment and monitoring methods	
10		Wastewater treatment: mechanical methods	
11		Biological cleaning methods	
12		Chemical cleaning methods	
13		Modern and innovative water purification technologies	
14		Water pollution control and management systems	
15		Legislation, international conventions and local regulations	
Recommended Sources TEXTBOOK(S)			
"Water Pollution: Causes, Effects and Control" by P.K. Goel			

<p>A comprehensive book covering types, sources, effects, and treatment methods of water pollution. "Environmental Chemistry" by Stanley E. Manahan Covers chemical aspects of water pollution and various treatment technologies. "Water Pollution Control: Principles and Practice" by C. S. Rao Focuses on principles of water pollution and practical approaches for control and treatment. "Introduction to Environmental Engineering" by Mackenzie L. Davis and David A. Cornwell Contains chapters on water pollution and wastewater treatment processes.</p>			
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 water bio-resources and aquaculture, “Department of Natural sciences”.

Course Unit Title	Sanitary Hydrobiology	
Course Unit Code	ATMF -B02	
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	Ahmedova Könül Yashar	
Name of Lecturer (s)	Ahmedova Könül Yashar	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
<p>The subject "Sanitary Hydrobiology" studies the role of biological indicators in assessing the ecological and sanitary condition of water bodies. Within the framework of the subject, students become familiar with the impact of aquatic organisms - microorganisms, plankton, benthos and nekton - on the ecological condition and the importance of these organisms as ecological indicators (bioindicators). Determining the level of pollution of water bodies through hydrobiological analyses and organizing sanitary control are among the main topics..</p>		
Objectives of the Course:		
<p>The main goal of this subject is to teach students the sanitary-epidemiological importance of living organisms living in water bodies, their application as bioindicators, and the principles of biological assessment of water quality. It is also intended to instill in students the skills of conducting laboratory hydrobiological analysis and ecological diagnostics.</p>		
Learning Outcomes		
<p>Define sanitary hydrobiology and explain its scope in environmental and public health. Identify major biological indicators of water quality, including microorganisms, plankton, and benthic organisms. Describe the role of microorganisms (bacteria, viruses, protozoa) in water pollution and waterborne diseases. Explain methods for sampling and analyzing aquatic biological communities to assess water quality.</p>		
At the end of the course the student will be able to		Assessment
1	Will recognize and classify the main biological components (plankton, benthos, nekton, and microflora) in aquatic ecosystems;	
2	Be able to explain the role of bioindicator organisms in assessing the sanitary status of water;	
3	Will be able to determine the degree of water pollution using hydrobiological indicators;	

4	Will be able to assess the sanitary condition of various water bodies.		
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 objectives of sanitary hydrobiology	
2		Biological characteristics of water bodies and their importance in terms of sanitation	
3		Microbiological pollution of the aquatic environment and its sanitary importance	
4		Bioindicator organisms and principles of their use	
5		The role of phytoplankton as a sanitary indicator	
6		The role of zooplankton in water quality assessment	
7		Application of benthic organisms as bioindicators	
8		Bacteria living in water and sanitary-microbiological analysis methods	
9		Parasitological and virological control methods in water bodies	
10		Oxygen regime in the aquatic environment and its sanitary-hydrobiological significance	
11		Responses of hydrobionts to anthropogenic impacts	
12		Sanitary-hydrobiological monitoring: purpose, methods and interpretation of results	
13		Biological treatment of wastewater and hydrobiological control	
14		Trophic level of water bodies and its sanitary significance	
15		Sanitary-hydrobiological status and protection of water resources of Azerbaijan	
Recommended Sources TEXTBOOK(S) "Sanitary Hydrobiology" by N.A. Vinogradsky A foundational textbook covering the biological indicators of water quality and their role in sanitary assessment. "Aquatic Microbiology" by J.G. Holt and R. R. Krieg Detailed coverage of microorganisms in aquatic environments, their identification, and significance in water sanitation. "Water Microbiology: Ecology and Pathogenesis" by Gabriel Bitton			

Discusses microbial populations in water and their impact on public health. "Environmental Microbiology" by Ian L. Pepper, Charles P. Gerba, and Terry J. Gentry Covers microbial contamination of water and sanitation processes			
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 water bio-resources and aquaculture, Department of "Natural sciences".

Course Unit Title	Decorative aquatic plants
Course Unit Code	ATMF -B10
Type of Course Unit	Selective
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	Gurbanova Lala Maharram gizi
Name of Lecturer (s)	Gurbanova Lala Maharram gizi
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
<p>The subject "Decorative Aquatic Plants" combines modern concepts in hydrobiology, botany, ecology, zoology and other scientific fields and substantiates and demonstrates the important environmental shaping role of aquatic plants in both natural and artificial aquatic ecosystems. The complex of scientific knowledge on aquatic plants covers the following issues: the concept of the aquatic environment, the basics of hydrobiology, the anatomical and morphological structure of aquatic plants (different aspects from plants growing on land), the ecology of aquatic plants (main mineral nutritional elements, gas exchange, trophic role, the role of plants in the self-purification of water bodies, etc.), the biodiversity of aquatic plants and other topics.</p>	
Objectives of the Course:	
<p>«When studying the subject "Decorative aquatic plants", the student must have knowledge of botany, chemistry, physics, mathematics. The course program involves close integration with many subsequent educational subjects. Studying the subject "Decorative aquatic plants" by students will help them successfully study the subjects of hydrobiology, ecology, zoology in the future, which, in turn, will inform students about the organization and mechanisms of functioning of ecosystems, the role of aquatic plants in these processes, and will also provide information about the ecosystem approach to the protection and use of biological and, in particular, fish resources. The study of aquatic plants is also based on the knowledge obtained from hydrology, chemistry, as well as fisheries, fisheries and other educational subjects.</p>	
Learning Outcomes	
<p>Identify a wide range of decorative aquatic plants, including floating, submerged, emergent, and marginal species.</p> <p>Describe the biological characteristics and habitat requirements of common ornamental aquatic plants.</p> <p>Explain the ecological role and benefits of aquatic plants in garden ponds, aquariums, and natural water bodies.</p> <p>Demonstrate proper techniques for planting, propagating, and maintaining decorative aquatic plants in both indoor and outdoor settings.</p>	
At the end of the course the student will be able to	
1	To develop in students an understanding of the important role of aquatic plants as key environmental factors in aquatic ecosystems;
2	To show that the ecosystem approach to the study of living nature is increasingly becoming the methodological basis of biological science;
3	To introduce students to the ecological classification of aquatic plants;
4	To provide students with a basis for understanding the importance of aquatic plants as habitats for fish and other aquatic life;
5	To explain the main topics about the ways in which plants adapt to their specific habitat, namely the aquatic environment, and to explain their anatomical and morphological characteristics.;
6	To create an idea of the systematics and biological diversity of aquatic plants in freshwater and marine ecosystems;
7	To ensure the development of biological culture in students in line with the level
Assessment	

	of modern science;		
8	To instill in students the skills to apply the ecosystem approach to biological material, including in the fields of science, fisheries, and nature conservation.		
9	To use ICT and electronic resources, prepare various electronic teaching materials and presentations on sections and topics		
10	To show the place of aquatic plants in the system of living nature;		
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 goals and objectives of the discipline of ornamental aquatic plants, their importance, and their relationship with other sciences	
2		Aquatic habitats of living organisms, basic concepts in hydrobiology, ecological classification of coastal aquatic plants	
3		Anatomical and morphological structural features of aquatic plants, their ecological relationships and adaptations	
4		Typology of water bodies for riparian vegetation and trophism	
5		Indicator indicator of riparian aquatic plants in aquatic ecosystems. The influence of environmental factors on the development of riparian aquatic plants.	
6		Classification of aquatic and semi-aquatic ornamental plants	
7		Types of water bodies	
8		Environmental factors affecting the development of aquatic and coastal ornamental plants	
9		Mineral and organic nutrition. Formation of the absorptive apparatus of plants. Mineral nutrition elements	
10		Plants and the environment. Environmental acidity. Interaction of higher aquatic plants with prokaryotes, some primitive plants and higher plants	
11		Aquatic and coastal ornamental plants in the aquatic biocenosis system	
12		Water and ornamental plants near water as a powerful factor in the	

		self-cleaning of reservoirs	
13		Reproduction and renewal of aquatic and near-water ornamental plants	
14		Cultivation and reproduction of aquatic and near-water ornamental plants	
15		Protection and rational use of water and ornamental plants near water	
<p>Recommended Sources</p> <p>TEXTBOOK(S)</p> <p>“Aquatic Plants of the World: A Manual for the Identification of the Genera of Freshwater Macrophytes” <i>Author: C.D.K. Cook</i> A comprehensive taxonomic guide for identifying freshwater aquatic plants globally.</p> <p>“Aquatic and Wetland Plants of Northeastern North America” <i>Author: Garrett E. Crow and C. Barre Hellquist</i> Two-volume set detailing aquatic plants with illustrations and ecological information.</p> <p>“Encyclopedia of Aquarium Plants” <i>Author: Peter Hiscock</i> A detailed guide for aquarists on the care, propagation, and design with aquatic plants.</p> <p>“Aquarium Plants: The Practical Guide” <i>Author: Pablo Tepoot</i></p>			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Marsh aquatic plants
Course Unit Code	ATMF -B10
Type of Course Unit	Selective
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	Qurbanova Lala Maharram qızı
Name of Lecturer (s)	Qurbanova Lala Maharram qızı
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: The "Marsh Aquatic Plants" training course aims to form modern ecosystem views in students by mastering the important environmental shaping role of marsh aquatic plants in aquatic ecosystems based on scientific knowledge. This course provides students with knowledge about the anatomical and morphological structure of aquatic plants, their systematics, importance, and use in fisheries, as well as conducting a botanical practicum.	
Objectives of the Course: When studying the subject "Wetland aquatic plants", the student must have knowledge of botany, chemistry, physics, mathematics. The course program involves close integration with many subsequent educational subjects. Studying the subject "Wetland aquatic plants" by students will help them successfully study the subjects of hydrobiology, ecology, zoology in the future, which will inform students about the organization and mechanisms of functioning of ecosystems, the role of aquatic plants in these processes, and will also provide information about the ecosystem approach to the protection and use of biological and, in particular, fish resources. The study of aquatic plants is also based on knowledge obtained from hydrology, chemistry, as well as fisheries, fisheries and other educational subjects..	
Learning Outcomes Identification and Classification Outcome: Students will be able to identify common marsh aquatic plants, both native and invasive species. Skills: Learn to distinguish between different species based on their morphological features, such as leaves, stems, flowers, and roots. Understanding Ecological Roles Outcome: Students will understand the ecological significance of marsh aquatic plants within wetland ecosystems. Skills: Analyze how marsh plants contribute to water filtration, provide habitat for wildlife, control	

erosion, and contribute to carbon sequestration.

Adaptations to Wetland Environments
 Outcome: Students will describe the specific adaptations that marsh aquatic plants have developed to thrive in wetland conditions (e.g., waterlogged soils, fluctuating water levels).
 Skills: Identify physiological traits such as aerenchyma tissues, specialized roots, and floating structures.

Impact of Environmental Changes
 Outcome: Students will evaluate the effects of environmental changes (such as climate change, pollution, and human activities) on marsh aquatic plant communities.
 Skills: Conduct experiments or surveys that assess the health of marsh plant populations in response to environmental stressors.

At the end of the course the student will be able to		Assessment
1	To develop in students an understanding of the important role of wetland aquatic plants as key environmental factors in aquatic ecosystems;	
2	To show that the ecosystem approach to the study of living nature is increasingly becoming the methodological basis of biological science;	
3	To introduce students to the ecological classification of wetland aquatic plants;	
4	To provide students with a foundation for understanding the importance of wetlands as habitats for fish and other aquatic life;	
5	To explain the main topics about the ways in which plants adapt to their specific habitat, namely wetlands, and to explain their anatomical and morphological characteristics;	
6	To show the place of wetland aquatic plants in the ecosystem;	
7	To instill in students the skills to apply the ecosystem approach to biological material, including in the fields of science, fisheries, and nature conservation.	
8	To use ICT and electronic resources, prepare various electronic teaching materials and presentations on sections and topics	
9	To ensure the development of biological culture in students in line with the level of modern 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 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 study of aquatic plants of wetlands	
2		Basic concepts of wetlands and main directions of modern wetland science	
3		Conditions for the formation and development of swamps	
4		Wetland biota	
5		Flora of the swamps	
6		The role of wetlands as plant habitats	
7		Peat-forming plants	
8		Wetland vegetation	
9		Algae flora of marshes	
10		Types of swamp biogeocenoses	
11		Wetland biogeocenoses: Eutrophic type biogeocenoses Mesotrophic type biogeocenoses	
12		Swamp biogeocenoses: Oligotrophic type biogeocenoses Heterotrophic type biogeocenoses	
13		Multifunctional role of wetlands	
14		The multifunctional role of wetlands	
15		Peat bog protection	
<p>Recommended Sources TEXTBOOK(S)</p> <p>"Wetland Plants: Biology and Ecology" by David G. R. McDonald, et al. Provides an in-depth look at wetland plant biology, including aquatic and marsh plants. It discusses their adaptations, ecological roles, and conservation efforts.</p> <p>"Aquatic and Wetland Plants of the Western Gulf Coast" by M. S. Shearer A guide specifically for the identification and understanding of aquatic plants in the Gulf Coast region, including marshes.</p> <p>"Field Guide to the Plants of the Wetlands of the Upper Midwest" by Catherine A. McAllister This guide focuses on the plant species found in wetland and marsh ecosystems in the Midwest, providing identification tips and ecological insights.</p> <p>"Ecology of Wetlands and Associated Systems" by John G. G. Jansen Explores the ecology of wetland ecosystems with a significant focus on marsh vegetation, including their role in nutrient cycling and habitat provision.</p>			
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			
<ul style="list-style-type: none"> • 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		1210
Total Workload/30(h)		120\30
ECTS Credit of the Course		4

MODULE HANDBOOK

Bachelor program in water bio-resources and aquaculture, Department of “Foreign Languages”.

Course Unit Title	Latin language
Course Unit Code	ATMF-B01
Type of Course Unit	Selection
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 Memmed qızı, b/m.
Name of Lecturer (s)	Mehdiyeva Lyudmila Memmed qızı, b/m.
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: Although Latin is no longer a spoken language, it has retained its independence in certain areas to this day, so that legal and medical terminology cannot be imagined without Latin. Many phonetic, grammatical, and lexical features of modern Romance languages can be understood on the basis of studying Latin.	
Objectives of the Course: It is to teach students the phonetics, grammar, and essential lexical minimum of terminology related to each section of the Latin language.	
Learning Outcomes	

Reading Comprehension: Ability to read and interpret Latin texts, from simple sentences to classical works by authors like Caesar, Cicero, and Virgil.

Vocabulary Acquisition: Understanding of Latin roots, prefixes, and suffixes, which can enhance vocabulary in English and other Romance languages.

Grammar Mastery: Knowledge of complex grammatical structures such as noun declensions, verb conjugations, and syntax.

Analytical Thinking: Improved ability to analyze sentence structures and understand logical relationships.

Memory and Recall: Strengthened memorization skills, especially with vocabulary, declensions, and conjugations.

Attention to Detail: Greater precision in understanding and using grammatical and syntactic rules.

At the end of the course the student will be able to		Assessment
1	Teaching Latin allows students to reveal their intellectual potential and to form creative individuals with high intelligence who are successful in the modern system of relations. In addition, the main goal is to assist in the educational process by creating free access to global information resources.	

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		Brief information about the history of the Latin language. The Latin alphabet and classification of sounds.	
2		Diphthongs. Pronunciation of consonants and letter combinations. Pronunciation of digraphs. Understanding of stress.	
3		Information about syllables. Long and short suffixes.	
4		Morphology. Noun (Substantium). Cases of nouns. Cases of first-class nouns.	
5		Case of nouns of the II and III types.	
6		Case of nouns of the IV and V types.	
7		Adjective (Adjectiva). Adverb (Adverbia).	
8		Pronouns. (Pronouns). Personal pronouns Possessive pronouns. Demonstrative pronouns.	
9		Pronomina interrogativa et relativa. Pronomina indefinite.	

10		Numeralia. The case of numbers.	
11		Verb. (Verbum). The indicative form of the verb. (Modusindicativus). The imperative form of the verb. (Modusimperativus). The imperative form of the verb. (Modusconjunctivus).	
12		Lexical minimum for verbs. I and II conjugation. Lexical minimum for verbs. III and IV conjugation.	
13		Simple sentence. Word order in a sentence.	
14		Prepositions-Praepositiones. Conjunctions-Conjunctiones	
15		Aphorisms in Latin	
<p>Recommended Sources</p> <p>TEXTBOOK(S)</p> <p><i>Lingua Latina per se Illustrata</i> by Hans Ørberg – A fully Latin textbook series that uses context to teach vocabulary and grammar.</p> <p><i>Fabulae Faciles (Easy Fables)</i> – Adapted versions of myths and historical anecdotes.</p> <p><i>Ecce Romani series</i> – Story-based Latin readers following a Roman family.</p> <p><i>Cambridge Latin Course</i> – Narrative-based introduction to Latin, often used in schools.</p>			
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			
<ul style="list-style-type: none"> 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Fish taxonomy and ecology	
Course Unit Code	ATMF -B06	
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	b.e.ü.f.d, Rajabova Sevinj Saadet q1z1	
Name of Lecturer (s)	b.e.ü.f.d, Rajabova Sevinj Saadet q1z1	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
Taxonomic age, anatomy and physiology of fish is the science of fish. The subject is taught to undergraduate students. In the lectures of the subject, students are taught knowledge about the taxonomic age, anatomy and physiology of fish in the world and in Azerbaijan, their history, divisions, the diversity of fish according to their biology and lifestyle, the characteristics of the aquatic environment such as the habitat of fish, the ecological groups of fish according to their adaptation to a certain habitat (marine fish, freshwater fish, migratory fish and brackish water fish), the systematics and distribution of fish		
Objectives of the Course:		
It consists of providing students with information about the structural characteristics of fish, ecological groups, distribution, intraspecific and interspecific interactions, systematics, skeleton, internal organs, their anatomy and physiology, reproduction, productivity, development stages, feeding, growth rate, as well as explaining their existing resources and importance in various water bodies.		
Learning Outcomes		
Define fish taxonomy and explain its importance in biological classification and biodiversity studies. Identify major fish taxonomic groups, including classes, orders, families, and common species. Describe key morphological features used in fish identification and classification. Explain the principles and methods of fish taxonomy, including systematics and nomenclature.		
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 "Fish Taxonomy and Ecology", scientific research methods, and its relationship with other sciences;	
2	Formation of ideas about training tools.	
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. Course purpose, objectives and development history.	
2		Taxonomy of cartilaginous fish. Sharks and rays.	
3		Ecology and economic importance of cartilaginous fishes.	
4		Taxonomy of bony fish. Primitive bony fish.	
5		Subclass of ray-finned fish. Order of sturgeon.	
6		A group of higher bony fish, the order of herring and salmon.	
7		The order of the cephalopods, the cephalopods, the mullet, and the khanopods.	
8		Ecology of bony fish and their role in aquatic biocenosis.	
9		Economic importance of bony fish.	
10		Ecological groups of fish.	
11		Fish reproduction.	
12		Fish migration and life forms.	
13		Intraspecific and interspecific relationships.	
14		The role of ecological factors in fish life.	
15		Regularities of geographical distribution of fish.	
Recommended Sources			
TEXTBOOK(S)			
<ol style="list-style-type: none"> "Fishes: An Introduction to Ichthyology" by Peter B. Moyle and Joseph J. Cech Jr. Comprehensive coverage of fish biology, taxonomy, and ecology. "Fish Taxonomy" by Jayaram K.C. Detailed guide on classification, morphology, and identification of fishes. "Ecology of Teleost Fishes" by Michael J. Winfield and John S. Nelson Focuses on ecological principles governing fish behavior, habitat, and populations. "Freshwater Fish Ecology" by Robert J. Naiman and Robert E. Bilby (Editors) Collection of studies on freshwater fish ecology, habitats, and ecosystem roles. 			
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		
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Histology of fish
Course Unit Code	ATMF -B07
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	b.e.ü.f.d, Racabova Sevinj Saadet q1z1
Name of Lecturer (s)	b.e.ü.f.d, Racabova Sevinj Saadet q1z1
Name of Assistant (s)	-

Mode of Delivery	Full time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
<p>Course description: Fish histology is the science that studies the structure, functions and developmental characteristics of fish at the tissue and cellular level. This subject covers the following main topics: Cell structure and function - the structure of fish cells, the functions of organoids; tissues - the structure and functional properties of epithelial, connective, muscle and nervous tissues; histology of organs - the microscopic structure of the skin, respiratory system, circulatory system, digestive system, excretory system and reproductive organs of fish; developmental histology - the embryonic development of fish and tissue differentiation; pathological changes - structural changes that occur in tissues during diseases</p>	
<p>Objectives of the Course: The aim of the subject of fish histology is to study the microscopic structure of various organs and tissues of fish and the biological functions of these tissues, to provide students with the ability to understand the histological structures of fish tissues and to apply appropriate research methods. In this course, you will study the main tissue types of fish and their structures, understand the histological structures of fish organs and their biological functions, understand the physiological properties of fish tissues and their role in life processes, and learn to use laboratory work and microscopic analysis in teaching fish histology.</p>	
<p>Learning Outcomes Interpret histological slides/images of fish tissues and organs using a microscope or virtual slide resources. Describe the cellular composition and arrangement in fish tissues, highlighting differences between species when relevant. Apply knowledge of fish histology to comparative anatomy and evolutionary biology studies. Understand common histological techniques used in fish tissue preparation, staining, and microscopy.</p>	
<p>At the end of the course the student will be able to</p>	
1	<p>Knowledge and understanding: explain the structure and functional properties of fish cells and tissues; understand the microscopic structure of fish organs and their role in physiological processes; understand the effects of diseases at the tissue level by comparing normal and pathological changes.</p>
2	<p>Skills: being able to analyze and identify fish tissues under a microscope; preparing histological preparations and evaluating them correctly; performing diagnostics by identifying changes occurring at the tissue level of fish.</p>
3	<p>Application and analysis: practical application of histological knowledge in aquaculture and fisheries; analyze problems related to fish health and diseases with a histological approach; identify histological differences between different fish species.</p>
4	<p>Creative thinking: establishing the relationship between the structure of fish tissues and their functions; conducting scientific research by evaluating the histological results obtained; investigating the histological aspects of the health of fish populations and ecological problems.</p>
<p>Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz</p>	

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 fish histology	
2		Cellular structure of the fish organism	
3		Epithelial tissue	
4		Connective tissue	
5		Muscle tissue	
6		Nervous tissue	
7		Blood and lymphatic tissues	
8		Digestive system	
9		Respiratory system in fish	
10		Excretory system in fish	
11		Endocrine system and hormones	
12		Heart and blood vessel tissues	
13		Skin and skin tissues in fish.	
14		Immune system and organs in fish	
15		Practical applications of histology in fish	
<p>Recommended Sources</p> <p>TEXTBOOK(S)</p> <ul style="list-style-type: none"> - "Fish Histology: Female Reproductive Systems" Author: Eduardo M. Balbontín Publisher: Science Publishers, 2006 - "Histology of the Fish" Author: S. R. Mukherjee Publisher: New Age International, 2011 - "Fish Histology: Male Reproductive Systems" Author: Eduardo M. Balbontín Publisher: Science Publishers, 2005 - "Fish Histology: A Text and Atlas" Author: J. B. Pawlina (general histology book with good fish examples) 			
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		
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Fish cytology
Course Unit Code	ATMF -B07
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	b.e.ü.f.d, Racabova Sevinj Saadet qızı		
Name of Lecturer (s)	b.e.ü.f.d, Racabova Sevinj Saadet qızı		
Name of Assistant (s)	-		
Mode of Delivery	Full Time		
Language of Instruction	English		
Prerequisites	-		
Recommended Optional Program Components	-		
Course description:			
Fish cytology is the study of the cellular structures, functions, and properties of fish. Fish cytology also helps to understand the lifestyle of fish species in various ecosystems and their ecology. Thus, Fish cytology allows us to understand the basic structures of fish organisms and their biological functions, and teaching in this field helps to gain more detailed information about the role of fish species in ecosystems and their biological development.			
Objectives of the Course:			
The aim of the subject of fish cytology is to study the cell structure and functions of fish, and to provide students with knowledge about the characteristics of fish cells, developmental stages, and other biological processes.			
Learning Outcomes			
Define and explain the basic principles of cytology in fish, including cell structure and function.			
Identify the different types of fish cells and their roles in physiology and development.			
Describe the process of cell division (mitosis and meiosis) in fish cells.			
Analyze fish tissue samples under the microscope to distinguish between various cell types and tissues.			
At the end of the course the student will be able to			Assessment
1	Increasing students' knowledge		
2	Development of practical skills		
3	Development of research and investigation skills		
4	Acquiring versatile knowledge		
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 fish cytology, the importance of the subject
2	Cell structure: nucleus, cytoplasm, mitochondria
3	Endoplasmic reticulum and ribosomes
4	Cell membrane and membrane structures
5	Cell division: mitosis
6	Cell division: meiosis
7	Energy production in fish cells: Metabolism
8	Intercellular communication and signal transduction
9	Cell damage and apoptosis processes
10	The effects of hormones and cellular regulation in fish
11	Fish cell proliferation and spermatogenesis
12	Cell culture
13	Genetic engineering
14	Cellular pathogenesis
15	Fish diseases

Recommended Sources

TEXTBOOK(S)

- **Understand the basic structure and function of fish cells**
- Describe the cellular components unique to fish and how they differ from other vertebrates.
- **Identify different types of fish cells and tissues under the microscope**
- Recognize and distinguish between epithelial, muscle, nerve, blood, and connective tissues in fish.
- **Explain the process of fish cell division and growth**
- Understand mitosis and meiosis in fish cells and their role in development and reproduction.
- **Analyze fish blood and hematology**
- Identify types of blood cells (erythrocytes, leukocytes, thrombocytes) and their functions.

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Fish embryology
Course Unit Code	ATMF -B06
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	b.e.ü.f.d, Racabova Sevinj Saadet qızı
Name of Lecturer (s)	b.e.ü.f.d, Racabova Sevinj Saadet qızı
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 "Fish Embryology" explains the subject, purpose and tasks of embryology, their relationship with other sciences, the structure and functions of the external and internal organs of fish, the stages and characteristics of embryonic and postembryonic development of fish, and other processes. The program also describes in detail the characteristics of individual stages of development depending on environmental factors, the skin-cover, respiratory, excretory, nervous, reproductive and digestive systems of fish, depending on their lifestyle.

Objectives of the Course:

It consists of providing students with information about the developmental characteristics of fish, the structural features and physiological functions of their external and internal organs, the regularities of embryonic and postembryonic development stages, depending on the systematic group to which they belong and their living conditions, as well as instilling the physiological foundations of artificial reproduction.

Learning Outcomes

Describe the stages of fish embryonic development Understand fertilization, cleavage, gastrulation, organogenesis, and hatching in different fish species. Differentiate between major types of fish eggs and embryonic development patterns Compare oviparous, ovoviviparous, and viviparous

development. Identify key morphological changes during early fish development			
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 "Fish embryology", scientific research methods, and its relationship with other sciences;		
2	Fish embryology is closely related to issues related to the rational use of fish resources, the implementation of fish protection measures in natural water bodies, as well as the creation of biotechnology for artificially increasing fish stocks. Formation of ideas about the relevance of fish embryology as a result of the deterioration of the ecological situation in water bodies in recent years due to human economic activity;		
3	Formation of ideas about training tools.		
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 objectives of fish embryology, its relationship with other sciences.	
2		Hormonal regulation of the natural reproduction process of fish.	
3		Development and differentiation of sex cells.	
4		Reproductive system of female fish. Oogenesis.	
5		The reproductive system of male fish. Spermatogenesis.	
6		Types of gametogenesis and hermaphroditism.	
7		Forms of reproduction in fish.	
8		Determining the maturity stage of fish gonads.	
9		Types of ontogenesis.	
10		Early ontogeny of bony fishes.	
11		Early ontogeny of true bony fishes.	
12		Diversity of reproductive conditions in cartilaginous and bony fish.	
13		Gonadotropins and sex pheromones.	
14		Hormonal regulation of gonadal development and spawning. Hypothalamus and pituitary.	

15		The importance of hormonal regulation of fish reproduction in aquaculture.	
Recommended Sources			
TEXTBOOK(S)			
1. Gilbert, S. F. (2014). <i>Developmental Biology</i> (10th ed.).			
2. Kimmel, C. B., Ballard, W. W., Kimmel, S. R., Ullmann, B., & Schilling, T. F. (1995). <i>Stages of Embryonic Development of the Zebrafish</i> . <i>Developmental Dynamics</i> , 203(3), 253–310.			
3. Balon, E. K. (1990). <i>Epigenesis of the Ichthyofauna: A Progressive View of Fish Ontogeny and Phylogeny</i> .			
4. Hall, B. K. (1999). <i>Evolutionary Developmental Biology</i> .			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Artificial fish farming	
Course Unit Code	ATMF -B08	
Type of Course Unit	Selective	
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	Yaraliyeva Lamia Adalat qızı	
Name of Lecturer (s)	Yaraliyeva Lamia Adalat qızı	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
Artificial fish farming is a subject that covers the teaching of theoretical and practical information about the cultivation of fish in artificial conditions in the field of fisheries and the principles of their management at various stages. This subject is taught with the aim of improving fisheries and developing artificial fisheries. Students are provided with knowledge about the technologies used in the fish farming process, water quality, selection of fish species, nutrition, disease prevention, and product marketing.		
Objectives of the Course:		
The main goal of the course in artificial fish farming is to provide students with information about artificial fish farming in the fisheries sector, their management, and the impact of this sector on the economy and ecosystem. The goal of this course is to prepare students for sustainable and effective management of artificial fisheries by providing them with not only theoretical information, but also practical experience.		
Learning Outcomes		
Define artificial fish farming (aquaculture) and explain its importance for food production, livelihoods, and environmental sustainability.		
Identify the different types of aquaculture systems (e.g., pond culture, cage culture, recirculating systems, integrated fish farming).		
At the end of the course the student will be able to		Assessment
1	Learning fish farming technologies	
2	Understanding the importance of artificial fishing	
3	Ecosystem adaptation	
4	Manage the production 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 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, development, forms and main directions of aquaculture	
2		Cell structure: nucleus, cytoplasm, mitochondria	
3		Forms and main directions of fish aquaculture	
4		Cell membrane and membrane structures	
5		Biological basis of artificial fish breeding	
6		Cell division: meiosis	
7		Nationally important fish species of Azerbaijan	
8		Intercellular communication and signal transduction	
9		Nationally important fish species of Azerbaijan	
10		The effects of hormones and cellular regulation in fish	
11		Main biotechnical stages of fish aquaculture	
12		Cell culture	
13		Sturgeon aquaculture	
14		Cellular pathogenesis	
15		Sturgeon aquaculture	
<p>Recommended Sources</p> <p>TEXTBOOK(S)</p> <ol style="list-style-type: none"> 1. Tiwari, V. K. (2011). <i>Textbook of Fish Culture and Fisheries</i>. Vikas Publishing House. 2. Pillay, T. V. R., & Kutty, M. N. (2005). <i>Aquaculture: Principles and Practices</i> (2nd ed.). Blackwell Publishing. 3. Stickney, R. R. (2009). <i>Aquaculture: An Introductory Text</i> (2nd ed.). CABI. 4. Boyd, C. E. (2019). <i>Water Quality: An Introduction</i>. 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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Genetics and selection of fish
Course Unit Code	ATMF -B08
Type of Course Unit	Selective
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	Doctor of Philosophy, Rajabova Sevinj Saadat qızı
Name of Lecturer (s)	Doctor of Philosophy, Rajabova Sevinj Saadat qızı

Name of Assistant (s)		-	
Mode of Delivery		Full Time	
Language of Instruction		English	
Prerequisites		-	
Recommended Optional Program Components		-	
Course description: The subject of fish genetics and breeding studies the genetic characteristics of fish, their hereditary transmission, various breeding methods, and how this knowledge can be applied in fisheries. This subject deeply analyzes the basic principles of fish breeding, hereditary variability, genetic diversity, and issues related to the improvement of genetic material.			
Objectives of the Course: The aim of the Fish Genetics and Breeding course is to learn the basics of fish genetics and breeding, to gain a deep understanding of the methods and applications in this field, and to gain knowledge about genetic engineering and breeding applications in the fishing industry.			
Learning Outcomes Define the basic concepts of genetics and heredity as they apply to fish and aquatic organisms. Explain the principles of Mendelian and non-Mendelian inheritance in fish populations.			
At the end of the course the student will be able to			Assessment
1	Formation of theoretical knowledge on fish genetics and selection principles		
2	Development of skills in the application of genetic selection, breeding and selection technologies		
3	Management of genetic resources and consideration of ethical and ecological issues		
4	Conducting research, developing breeding programs, and using innovative approaches		
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 the subject, general information about fish genetics	

		and breeding	
2		Fundamentals of genetic theory, genetic material, chromosomes and genes	
3		Basic laws of heredity: Mendel's laws	
4		Genetic mutations and their effects in fish	
5		Polymorphism and genetic diversity in fish populations	
6		Selection methods: Types of selection, natural selection and artificial selection	
7		Artificial selection of fish and its application	
8		Fish Species Selection: Breeding and Development	
9		Genetic markers and their use in fish breeding	
10		Management of breeding programs	
11		Hereditary diseases and genetic disorders in fish species	
12		Application of genetic engineering and biotechnology to fisheries	
13		Ecological and economic aspects of fish breeding	
14		Analysis of genetic analysis and selection methods	
15		Discussion of experiences and research related to fish breeding	
<p>Recommended Sources</p> <p>TEXTBOOK(S)</p> <ol style="list-style-type: none"> 1. "Aquaculture Genetics" – R. S. P. van der Steen, H. Komen, J. W. B. van Arendonk 2. "Genetics and Breeding for Disease Resistance of Livestock" (relevant chapters for fish) – Edited by S.C. Bishop et al. 3. "Genetics in Aquaculture" Series – Volumes I-VIII – Edited by G.A.E. Gall & C.E. Purdom 4. "Aquaculture Genome Technologies" – Zhanjiang (John) Liu 			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Fish diseases
Course Unit Code	ATMF -B08
Type of Course Unit	Selective
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	Yaraliyeva Lamia Adalat
Name of Lecturer (s)	Yaraliyeva Lamia Adalat
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 “Fish Diseases” provides extensive information about ichthyopathy. The program teaches students modern knowledge about fish diseases, bacterial, mycosis, invasion, protozoan, intestinal diseases, helminthiasis, non-transmissible diseases, diseases caused by environmental conditions, and helminthiasis dangerous to the lives of humans and animals.	
Objectives of the Course:	
To teach students the ichthyopathology of fish species of national importance in Azerbaijan. To provide information on the scientific foundations of the efficient use of fish as a component of aquatic bioresources, technologies for their cultivation in natural and artificial water bodies and their protection, and to explain the importance of aquaculture in the proper organization of anthropogenic activity in the development of fisheries and various farms..	
Learning Outcomes	
Identify common bacterial, viral, fungal, and parasitic diseases affecting freshwater and marine fish	

species.
Describe the etiology, symptoms, and pathological effects of major fish diseases. Explain the modes of transmission and life cycles of key fish pathogens. Recognize environmental and management factors that contribute to the outbreak and spread of fish diseases.

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 "Fish Diseases", scientific research methods, and its relationship with other sciences;	
2	Formation of ideas about ichthyopathy;	
3	Formation of ideas about training tools;	

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		Fundamentals of general parasitology	
2		Brief information about the anatomy and physiology of fish	
3		Diagnosis of diseases in fish	
4		Viral diseases of fish	
5		Bacterial diseases of fish	
6		Mycosis diseases of fish	
7		Invasive fish diseases	
8		Protozoal diseases of fish	
9		Diseases caused by intestinal parasites in fish	
10		Diseases caused by helminths in fish	
11		Diseases caused by crustaceans in fish	
12		Non-transitory diseases. Alimentary diseases	
13		Diseases caused by the influence of unfavorable environmental conditions	
14		Fish are carriers of dangerous bacteria, toxins, and helminths. Food	

		poisoning.	
15		Helminths dangerous to the life of humans and animals	
Recommended Sources			
TEXTBOOK(S)			
1. “Fish Diseases and Disorders, Volume 1: Protozoan and Metazoan Infections” <i>Editors: P.T.K. Woo and K. Buchmann</i>			
2. “Fish Diseases and Disorders, Volume 2: Non-infectious Disorders” <i>Editors: P.T.K. Woo and K. Buchmann</i>			
3. “Fish Diseases and Disorders, Volume 3: Viral, Bacterial and Fungal Infections” <i>Editors: P.T.K. Woo and K. Buchmann</i>			
4. “Aquatic Animal Health Code” <i>Published by: World Organisation for Animal Health (OIE)</i>			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Hydrology	
Course Unit Code	ATMF -B10	
Type of Course Unit	Selective	
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	Konul Ahmadova	
Name of Lecturer (s)	Konul Ahmadova	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
<p>“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..</p>		
Objectives of the Course:		
<p>The main goal of the course is to get to know aquatic animals, to examine their origin and evolution, the main features of their historical development, to acquire knowledge about the protection 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..</p>		
Learning Outcomes		
<p>Explain the components of the hydrologic cycle, including precipitation, evaporation, transpiration, infiltration, runoff, and groundwater flow.</p> <p>Interpret hydrological data such as rainfall records, streamflow measurements, and groundwater levels using appropriate tools and techniques.</p> <p>Apply fundamental principles of surface water hydrology, including watershed modeling, hydrograph analysis, and runoff estimation.</p> <p>Analyze groundwater flow using Darcy’s Law and related aquifer parameters</p>		
At the end of the course the student will be able to		Assessment
1	To become familiar with the subject, goals and objectives of hydrobiology;	
2	To become familiar with the characteristics and classification of aquatic animals, as well as their taxonomic characteristics;	
3	To learn methods of studying aquatic animals belonging to various systematic groups;	
4	The scientific, economic, technical, educational, medical, aesthetic, and natural	

	significance of aquatic animals, the attitude of the population towards 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;	
5	To learn about the effective use of water bodies, ways to protect them, the importance of regional and international cooperation, species introduced to the local fauna, reasons why animals are rare, 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		The 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 effect of the active reaction of the environment (pH) on hydrobionts. Interaction of hydrobionts with light	
6		Nutrition and food relationships of hydrobionts	
7		Interaction of hydrobionts with organic matter	
8		The interaction of organisms with complex environmental factors	
9		Biological productivity of water bodies	
10		Hydrobiological regime of the oceans	
11		Hydrobiological regime of the seas	
12		Hydrobiological regime of rivers	
13		Hydrobiological regime of reservoirs	
14		Hydrobiological regime of lakes	
15		Hydrobiological regime of reservoirs and artificial lakes. Cultivation	

		of live food organisms	
Recommended Sources			
TEXTBOOK(S)			
1. “Hydrology and Hydraulic Systems” <i>Author: Ram S. Gupta</i>			
2. “Applied Hydrology” <i>Authors: Ven Te Chow, David R. Maidment, Larry W. Mays</i>			
3. “Hydrology: An Introduction” <i>Author: Wilfried Brutsaert</i>			
4. “Introduction to Hydrology” <i>Author: Warren Viessman Jr. and Gary L. Lewis</i>			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Marine flora	
Course Unit Code	ATMF -B09	
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	b.ü.f.d Humbatov Mahmud Farzali	
Name of Lecturer (s)	b.ü.f.d. Humbatov Mahmud Farzali	
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.		
Learning Outcomes		
Identify major groups of marine flora including phytoplankton, macroalgae (seaweeds), and seagrasses.		
Describe the taxonomy, morphology, and physiology of common marine plants and algae.		
Explain the ecological roles and functions of marine flora in coastal and oceanic ecosystems.		
Analyze the environmental factors affecting the distribution and growth of marine flora.		
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 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		“Goals and objectives of the subject "Marine flora". General summary of the seas, the Caspian Sea	
2		The plant world of the seas. Primitive plants.	
3		Biodiversity of algae. Ecological groups.	
4		Algae research methods	
5		Algae in Caspian Sea ecosystems: Green algae, Blue-green algae.	
6		Diatoms. Dinophytes	
7		Macrophytes of the Caspian Sea: Brown and Red Algae	
8		Parasitic algae	
9		Algae and environmental factors	
10		The life cycle of algae	
11		The practical importance of algae	
12		Algae aquaculture	
13		Biodiversity and seasonal dynamics of phytoplankton	
14		Higher plants in the marine ecosystem	
15		Higher plants of the Caspian Sea basin	

Recommended

Sources

TEXTBOOK(S)

1. **“Marine Botany”**
Author: C.D. Reid, L.R. Hunter, and K.J. Norton
2. A classic introduction to the biology and ecology of marine plants.
3. **“Marine Algae of the Northern Hemisphere”**
Author: M.D. Guiry and G.M. Guiry
4. Comprehensive taxonomic guide to seaweeds with distributional data.
5. **“Seagrasses: Biology, Ecology and Conservation”**
Editors: A.W.D. Larkum, R.J. Orth, and C.M. Duarte
6. Detailed coverage of seagrass biology and their ecosystem services.
7. **“Introduction to Phycology”**

Author: C.S. Lobban and M. Wynne

8. Thorough textbook on algae biology, including marine species.

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Plankton and its breeding technology	
Course Unit Code	ATMF -B09	
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	Ahmadova Konul Yashar	
Name of Lecturer (s)	Ahmadova Konul Yashar	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:	<p>The course "Plankton and its breeding technology" is one of the elective biological subjects and is taken by students of the Faculty of Aquatic Bioresources and Aquaculture in the third year of study. The material of this course covers all plankton organisms, provides information about their characteristic features and classification, breeding methods, breeding methods, their ecology, ethology, trophic relationships, role and importance in the biocenosis. The protection of endangered animals, disturbing factors, preservation of biological diversity, efficient use of animals, etc. are mastered.</p>	
Objectives of the Course:	<p>The main goal of the course is to recognize plankton organisms, investigate the importance and characteristics of their breeding, and acquire knowledge about the protection of important aquatic animals, their current status, the reasons for their decline, their importance in nature, etc.</p>	
Learning Outcomes	<p>Identify and classify the major groups of plankton: phytoplankton (plant-like) and zooplankton (animal-like), including common genera used in aquaculture (e.g., <i>Chlorella</i>, <i>Nannochloropsis</i>, <i>Rotifers</i>, <i>Artemia</i>).</p> <p>Explain the ecological role of plankton in aquatic ecosystems, particularly as a primary producer and a foundation of the aquatic food web.</p> <p>Describe the nutritional value of plankton for larval and juvenile stages of fish, shrimp, and shellfish.</p> <p>Discuss environmental factors (light, temperature, pH, salinity, nutrients) influencing plankton growth and reproduction.</p>	
At the end of the course the student will be able to	Assessment	
1	To become familiar with the subject, goals and objectives of the discipline of plankton and its cultivation technology;	

2	To become familiar with the characteristics and classification of important aquatic animals in aquaculture, as well as their taxonomic characteristics;	
3	Learn the methods of cultivating organisms belonging to the plankton group;	
4	To know the scientific and economic, as well as the nature-related, importance of aquatic animals, the breeding factors and biological characteristics of the studied object;	
5	To become familiar with the effective use of plankton organisms.	

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 plankton	
2		Adaptation of planktonic organisms to a pelagic lifestyle	
3		Types of zooplankton organisms and their characteristics	
4		Characteristics of planktonic organisms belonging to the group <i>Rotifera</i>	
5		Characteristics of planktonic organisms belonging to the group <i>Cladocera</i>	
6		Characteristics of planktonic organisms belonging to the group <i>Copepoda</i>	
7		Methods for calculating the density and biomass of zooplankton organisms	
8		Environmental factors affecting the distribution of zooplankton organisms	
9		Types of zooplankton organisms that live in marine ecosystems	
10		Breeding of zooplankton organisms	
11		Using planktonic organisms as indicators of the health of aquatic ecosystems	
12		Morphological changes of planktonic organisms and their causes	
13		Energy production by phytoplankton organisms through	

		photosynthesis	
14		The importance of planktonic organisms in the food chain in aquatic ecosystems	
15		The role of planktonic organisms in absorbing carbon dioxide from the atmosphere and in the carbon cycle	
<p>Recommended Sources</p> <p>TEXTBOOK(S)</p> <ol style="list-style-type: none"> "Live Food in Aquaculture" – Edited by B. A. Bengtson, D. C. Bromage, and J. J. Bogen <i>Covers comprehensive methods for culturing live feed organisms including phytoplankton, rotifers, and Artemia.</i> ISBN: 9780412810302 "Microalgae: Biotechnology and Microbiology" – E. W. Becker <i>Focuses on microalgae biology, cultivation methods, and applications in aquaculture and biotechnology.</i> "Rotifers in Aquaculture" – Edited by C. A. Edwards and T. J. Walsh <i>Detailed guide on zooplankton (especially rotifers) breeding techniques in hatchery systems.</i> "Aquaculture: Farming Aquatic Animals and Plants" – J.S. Lucas, P.C. Southgate <i>Includes chapters on plankton management, live feed production, and aquaculture systems.</i> "Manual on the Production and Use of Live Food for Aquaculture" – FAO Fisheries Technical Paper 361 FAO link <i>Practical, step-by-step instructions for culturing microalgae, rotifers, Artemia, and more.</i> 			
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			
<ul style="list-style-type: none"> 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Oceanology		
Course Unit Code	ATMF -B09		
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	Doctor of Philosophy, Humbatov Mahmud Farzali		
Name of Lecturer (s)	Doctor of Philosophy, Humbatov Mahmud Farzali		
Name of Assistant (s)	-		
Mode of Delivery	Full Time		
Language of Instruction	English		
Prerequisites	-		
Recommended Optional Program Components	-		
Course description: General oceanology is a field of science that studies the regularities of physical, chemical, biological, etc. processes occurring in the oceans and seas. By mastering this field of science, the efficient use of the natural resources of the oceans and seas is achieved.			
Objectives of the Course: The aim of the subject is to obtain detailed information about the oceans, the physical-chemical and biological processes taking place there, and to obtain the natural resources of the ocean for human use. Brief information about the subject, related subjects (directly related/compatible), and the objectives of teaching the subject. It states what students will know, what they will achieve and what skills they will acquire by studying this subject.			
Learning Outcomes			
At the end of the course the student will be able to			Assessment
1	Explains the nature of physical processes occurring in the oceans and seas;		
2	Analyzes the dynamics and dimensions of waves;		
3	Justifies the causes and current state of ocean and sea level fluctuations;		

4	It provides flow regime, temperature regime and other characteristics, as well as their distribution within space-time;		
5	Analyzes the impact of changes in the seas and oceans on climate;		
6	Evaluates the impact of ocean and sea currents on the climate of continents and the current research in this direction.		
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, goals and objectives of oceanology. Stages of development of oceanology	
2		Morphometric characteristics of the World Ocean	
3		Formation of the water mass of the World Ocean and its water balance.	
4		Physical characteristics of sea water. 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		Anomaly of the physical properties of water. Sea ice, their classification	
10		Basic 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 and general circulation of the world's oceans	
14		Ocean currents and the forces that cause them. Ekman theory of ocean currents	
15		The slope of isobaric and isosteric surfaces during flow	
Recommended Sources			

TEXTBOOK(S)			
1. "Introduction to Ocean Sciences" – Douglas A. Segar <i>An accessible and comprehensive introduction covering all major areas of oceanography.</i>			
2. "Essentials of Oceanography" – Alan P. Trujillo & Harold V. Thurman <i>One of the most popular undergraduate-level texts with excellent visuals and explanations.</i> ISBN: 9780134298066			
3. "Oceanography: An Invitation to Marine Science" – Tom S. Garrison <i>Engaging and interdisciplinary, includes environmental and policy perspectives.</i>			
4. "Descriptive Physical Oceanography: An Introduction" – Lynne D. Talley et al. <i>A classic reference focused on the physical structure and circulation of the oceans.</i>			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Fishing, hunting gear and fishing methods	
Course Unit Code	ATMF -B12	
Type of Course Unit	Selective	
Level of Course Unit		
National Credits	-	
Number of ECTS Credits Allocated	7	
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	b.e.ü.f.d, Rajabova Sevinj	
Name of Lecturer (s)	b.e.ü.f.d, Rajabova Sevinj	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
The course “Fishing, hunting tools and fishing methods” is one of the bioecological subjects and is taken by students in the third year of study. The material of this course covers all fish of national importance, provides information about their characteristic features and classification, evolution, structural features of individual organ systems, their ecology, role and importance in the biocenosis. The efficient use of fishing, etc. is mastered.		
Objectives of the Course:		
The main goal of the course is to learn about fish, their hunting methods and the hunting tools used in fishing, to explore the main features of fish development, to acquire knowledge about their current status, current distribution areas, importance in nature and human life, etc.		
Learning Outcomes		
Learn about the various types of fishing rods, reels, and lines (e.g., spinning, baitcasting, fly fishing). Identify the different types of hooks, baits, and lures used for various fish species. Understand the importance of tackle boxes, nets, fishing accessories, and safety equipment (e.g., life jackets, first-aid kits).		
At the end of the course the student will be able to		Assessment
1	To study modern methods of fish analysis in the field of fishing, the primary causes that determine the dynamics of fish schools, the basic equations that express the dynamics of fish schools, the biological foundations of fishing, and methods of marking fish;	
2	Study fishing tools and equipment used in industrial fishing, methods for assessing the intensity and selectivity of fishing;	
3	study the impact of overfishing on population productivity, legislation on fisheries and fishing regulations, and the concept of overfishing;	
4	Collecting fishery-relevant data on fish populations and ichthyosis as a	

	whole;		
5	Use fishing gear and technical means, participate in monitoring fisheries, protecting aquatic bioresources, and inspecting fisheries;		
6	Be able to justify the size of the Total Allowable Catch (TAC). Be able to justify the size of the Total Allowable Catch (TAC).		
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		Fish species diversity and the main principles of their distribution. Ichthyofauna of Azerbaijan and the main fish species	
2		The effect of abiotic factors on fish. The effect of biotic factors on fish.	
3		Fish feeding. Fish plumpness. Fish fatness.	
4		Fish reproduction, age and growth of fish, fertility.	
5		The concept of industrial fishing. Its place in fishing. Intensive lake farms. General characteristics of lake farms.	
6		Industrially farmed fish species and their biological characteristics.	
7		Order: Carp, Order: Sturgeon. Order: Carp, Order: Herring.	
8		Cultivation of industrial fishing objects in natural and artificial water bodies.	
9		General characteristics and history of industrial fishing. Materials used in the manufacture of fishing gear.	
10		General characteristics of industrial hunting methods using hook-and-loop hunting gear	
11		Trawling regulations.	
12		Hooked hunting tools. Filtered hunting tools.	
13		General characteristics of fishing with artificial nets	
14		Fishing with the help of electric light.	
15		Fishing with the help of electric current	
Recommended			

Sources			
TEXTBOOK(S)			
1. "The Total Fishing Manual" by Joe Cermele and the Editors of Field & Stream			
2. "The Fisherman's Handbook" by Derek L. D. Pyle			
3. "Rod Building for Beginners" by Tom Kirkman			
4. "The Complete Guide to Fishing Gear" by Ken Schultz			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Sport fishing and fish tourism	
Course Unit Code	ATMF -B12	
Type of Course Unit	Selective	
Level of Course Unit		
National Credits	-	
Number of ECTS Credits Allocated	7	
Theoretical (hour/week)	3	
Practice (hour/week)	2	
Laboratory (hour/week)	-	
Year of Study	1	
Semester when the course unit is delivered	2	
Course Coordinator	Ahmadova Konul Yaşar	
Name of Lecturer (s)	Ahmadova Konul Yaşar	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
<p>The course "Sport Fishing and Fishing Tourism" is an elective biological subject, taken by students of the Faculty of Aquatic Bioresources and Aquaculture in their fourth year of study. The material in this course provides information on recreational activities centered around fishing for pleasure, competition, and travel experiences. This topic explores the intersection of recreation, environmental stewardship, cultural appreciation, and economic development through fishing-related tourism.</p>		
Objectives of the Course:		
<p>The main objective of this course is to provide students with a comprehensive understanding of sport fishing and fishing tourism as recreational, cultural and economic activities. The course aims to develop knowledge and skills related to sustainable fishing practices, tourism development, environmental protection and community participation. By the end of the course, students will have acquired the knowledge to evaluate, plan and promote responsible fishing tourism initiatives that benefit both the environment and local economies.</p>		
Learning Outcomes		
Knowledge of Fish Species and Ecosystems		
<p>Identify common fish species targeted in sport fishing and understand their behavior, biology, and habitat needs. Understand the ecological role of different fish species in various ecosystems (e.g., freshwater vs. saltwater). Analyze the impact of environmental changes (e.g., water quality, climate change) on fish populations and fisheries.</p>		
At the end of the course the student will be able to		Assessment
1	Description of the principles and practices of sport fishing and fish tourism;	
2	Identify and use various sport fishing techniques and equipment;	
3	Assessment of the environmental and ecological impacts of fishing tourism;	
4	Analysis of the economic and social contributions of fishing tourism;	
5	Interpretation of relevant laws, policies and ethical guidelines;	
6	Interpretation of relevant laws, policies and ethical guidelines;	
7	Designing and promoting sustainable fish tourism practices.	

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 sport fishing and fishing tourism	
2		History and evolution of recreational fishing	
3		Types and techniques of sport fishing	
4		Fishing tackle, tools and safety equipment	
5		Freshwater and saltwater fishing experiences	
6		Target species: commercial fisheries worldwide	
7		Fish behavior and habitat identification	
8		Fishing and fish release: principles and successful practices	
9		Boating Basics for Sport Fishing Tours	
10		Environmental impacts of tourist fishing	
11		Sustainable fishing practices and conservation ethics	
12		Fishing tourism destinations: global and local hotspots	
13		Tourism management in fishing communities	
14		Design of fishing tour packages and experiences	
15		Marketing and promotion in fishing tourism	
16		Legal and regulatory frameworks in sport fishing	
17		Licensing, permissions and access rights	
18		Fishing tourism and community development	
19		Cultural heritage and local fishing practices	
20		The role of ecotourism and fishing tourism	
21		Guiding and translation skills for fishing tours	
22		Risk management and safety at sea or inland waters	
23		Trends, problems and future of fishing tourism	

Recommended

Sources

TEXTBOOK(S)

1. **"Sport Fishing: A Guide to Freshwater and Saltwater Angling"** by **John E. Phillips**
2. **"Fisheries Management: A Manual for Stillwater Coarse Fisheries"** by **Chris Yates**

3. "The Nature of Saltwater Fishing" by R. K. Croft		
4. "Marine Conservation and Coastal Communities: A Handbook for Fishery and Tourism Operators" by Roberto C. Rojas		
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		
<ul style="list-style-type: none"> • 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)
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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Decorative fishing
Course Unit Code	ATMF -B12
Type of Course Unit	Selective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	7
Theoretical (hour/week)	3

Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	2
Course Coordinator	Ahmadova Konul Yaşar
Name of Lecturer (s)	Ahmadova Konul Yaşar
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
<p>The subject "Ornamental Fisheries" covers the study of theoretical and practical knowledge on the maintenance, feeding and breeding of aquatic animals, especially fish, for aesthetic purposes. Within the framework of the subject, students acquire knowledge about the basic principles of aquarium fisheries, the biology of various types of ornamental fish, their keeping conditions, the design and technical support of aquariums, fish nutrition, disease prevention and treatment. The subject also touches on environmental issues such as maintaining the balance of aquatic ecosystems, the role of aquatic plants and regulating water parameters. Through practical lessons, students gain skills in the field of setting up aquariums, selecting ornamental fish species and caring for them.</p>	
Objectives of the Course:	
<p>The main goal of the course is to provide theoretical and practical knowledge in the field of ornamental fishing; to form a professional approach in students to aquarium design and selection of fish species; to instill ornamental fishing habits based on the principles of ecological balance and animal welfare.</p>	
Learning Outcomes	
<p>Understanding of Ornamental Fish Species Identify various ornamental fish species commonly kept in aquariums or decorative ponds (e.g., goldfish, koi, guppies, bettas, tetras). Understand the biological and ecological requirements of ornamental fish, including water temperature, pH, and oxygen levels. Learn about the behavioral characteristics of different ornamental fish species and their compatibility with</p>	
At the end of the course the student will be able to	
1	Will be able to recognize the main types of ornamental fish and explain their biological characteristics;
2	Will acquire knowledge about the structure, technical equipment, and design principles of aquariums;
3	Will be informed about the rules for feeding and breeding ornamental fish;
4	Will be familiar with common diseases found in fish and their prevention/treatment methods;
5	Will gain practical skills in regulating and monitoring water parameters (temperature, pH, oxygen level, etc.);
6	Will master the principle of maintaining ecological balance and managing healthy aquatic ecosystems in aquarium conditions;
7	Develop creative skills in the aesthetic and functional design of decorative aquariums;
8	Will be able to apply care rules in accordance with safety and animal welfare standards.
Assessment	
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 and historical development of ornamental fishing	
2		Systematics and classification of ornamental fish	
3		Types and principles of construction of aquariums	
4		Parameters of the aquatic environment and their regulation	
5		Ornamental fish nutrition and feeding technologies	
6		Methods of breeding ornamental fish	
7		Diseases and prevention observed in fish	
8		Technical equipment for the aquarium and their use	
9		Aquarium design and selection of decorative elements	
10		Live aquarium plants and their role	
11		Fish behavior and compatibility issues	
12		Setting up a new aquarium and setting up the water cycle (cycling)	
13		Ecological aspects and responsible animal husbandry in ornamental fisheries	
14		Commercial potential and entrepreneurship in ornamental fisheries	
15		Lecture: Course summary and general review	
<p>Recommended Sources TEXTBOOK(S)</p> <p>"The Complete Aquarium Manual" by Dr. Peter W. Scott</p> <ol style="list-style-type: none"> "The Art of Aquarium Keeping" by Martin S. Moe Jr. "Aquarium Care of Freshwater and Marine Fish" by Mary Bailey "Koi and the Koi Keeper: A Guide to Keeping Koi and Other Pond Fish" by Terry Ann Spitzer "The New Aquarium: Creating the Perfect Freshwater or Saltwater Aquarium" by Mike Wickham 			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Philosophy”.

Course Unit Title	Environmental law
Course Unit Code	ATMF-B04
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	3
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	1
Course Coordinator	Eynulla Bakhshaliyev
Name of Lecturer (s)	Eynulla Bakhshaliyev
Name of Assistant (s)	-

Mode of Delivery		Full Time	
Language of Instruction		English	
Prerequisites		-	
Recommended Optional Program Components		-	
Course description: To ensure the formation of relevant knowledge, skills and habits of the future qualified specialist, ensuring his/her scientific-theoretical and professional (practical) training, so that he/she can independently carry out his/her activities.			
Objectives of the Course: Providing systematic knowledge to the future qualified professional, forming a correct scientific-methodological and normative view of contractual legal relations. Forming concepts based on the necessary information about the basics of contract law, as well as forming relevant knowledge, skills and habits that will be applied in the future.			
Learning Outcomes: Explains the subject, goals and objectives, scientific research methods, and relationship with other sciences of ecological law and the legal foundations of nature use. 2. Explains the application of legal areas in the field of economic activity to specific economic relations for the main provisions of ecological law and the legal foundations of nature use. 4. Makes logical judgments, draws conclusions, and justifies them.			
At the end of the course the student will be able to		Assessment	
1	The course curriculum includes providing information on the legal basis of environmental protection activities, the main institutions and main provisions, as well as the regulatory framework.		
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		General characteristics of environmental law. Principles of environmental law	
2		The concept and characteristics of ecological legal relations. Objects of ecological law	
3		Regulation of management in the sphere of environmental legal relations	
4		The right to use nature as an institution of environmental law	
5		The concept and types of environmental damage	

6		Methods of compensation for environmental damage	
7		The concept of liability for violation of environmental legislation	
8		Types of liability for violation of environmental legislation.	
9		General characteristics of international environmental law	
10		Fundamentals of the right to use nature. The concept and functions of nature use management	
11		Basis for the establishment, change and termination of ownership rights to natural objects	
12		Rights and obligations of owners, users and tenants of natural resources	
13		Ownership of natural objects. Legal regime of specially protected natural objects	
14		Features of environmental protection. Organizational and legal mechanisms of environmental protection.	
15		International legal mechanisms for environmental protection. Environmental protection in times of war	

Recommended Sources

TEXTBOOK(S)

1. Erofeev B.V. Environmental law. Moscow, 2012
2. Petrov B.V. Environmental Law of Russia, Moscow 2014
3. Environmental management. Head. editor L.I. Aliyeva.
4. Textbook for higher schools. Baku 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	180
Total Workload/30(h)	180\30
ECTS Credit of the Course	7

MODULE HANDBOOK

Bachelor program in water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Bioinformatics	
Course Unit Code	ATMF-B11	
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	4	
Semester when the course unit is delivered	1	
Course Coordinator	PhD Ayaz Mammadov	
Name of Lecturer (s)	PhD Ayaz Mammadov	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
Bioinformatics is a multidisciplinary field at the intersection of biology and computer science that studies the application of computational and statistical methods to the collection, storage, analysis, and interpretation of biological data. The subject provides students with knowledge of the basic bioinformatics concepts, tools, methodologies, and databases designed to process big data (genome, transcriptome, proteome, etc.) generated in the fields of molecular biology and genetics.		
Objectives of the Course:		
Students acquire theoretical and practical skills in topics such as gene and protein sequence alignment, phylogenetic analysis, gene annotation, gene expression analysis, modeling and visualization of structural biological data. In addition, they develop skills in working with BLAST, ClustalW, MEGA, UniProt, Ensembl, Bioconductor, Biopython and other bioinformatics platforms.		
Learning Outcomes		
This subject not only teaches students the analysis methods used in modern biology and biomedicine, but also develops their research and scientific-analytical thinking skills.		
At the end of the course the student will be able to		Assessment
1	To teach students the basic principles and application areas of bioinformatics	
2	To introduce them to the tools and methods used for the management and analysis of biological data	

3	· To form analytical thinking and practical skills in students regarding genetic and molecular data		
4	· To prepare them for their future scientific activities by introducing them to modern research methodologies.		
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 Bioinformatics	
2		Biological Data Types and Databases	
3		FASTA and Other Sequence Formats	
4		Sequence Alignment – Pairwise and Multiple Alignment	
5		BLAST and Homologous Search Algorithms	
6		Genome Annotation	
7		Phylogenetic Analysis	
8		Molecular Markers and Bioinformatic Analysis	
9		Protein Structure and Function Prediction	
10		Transcriptome Analysis and RNA-Seq	
11		Microarray Technology and Data Analysis	
12		Systems Biology and Network Analysis	
13		Population Genomics and Bioinformatics	
14		Epigenomics and Methylation Analysis	
15		Bioinformatic Tools and Programming Fundamentals	
<p>Recommended Sources</p> <p>TEXTBOOK(S)</p> <ol style="list-style-type: none"> 1. Muhammed Şakiroğlu. Genomik analizler için Biyoinformatik yöntemler. Ankara 2021. – Böckenhauer H.J., B. Dirk. 2007. Algorithmic aspects of bioinformatics. Springer-Verlag, Berlin, Heidelberg. 2. . Benjamin Lewin, Genes, 2000. 3. . David W. Mount, “Bioinformatics: Sequence and genome analysis” Cold Spring Harbor Laboratory Press, New York, 2004. 			

4. – Baxevanis D., B.F. Francis Ouellette. 2005. Bioinformatics: A Practical Guide to the Analysis of Genes & Proteins (third edition), John Wiley & Sons.

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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Computer modeling in biology	
Course Unit Code	ATMF-B11	
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	4	
Semester when the course unit is delivered	1	
Course Coordinator	Sema Bayramova	
Name of Lecturer (s)	Sema Bayramova	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
A brief description of the subject, the purpose of teaching the subject, and the methods to be applied in teaching the subject are explained in writing. What students will know, what they will achieve, and what skills they will acquire by studying this subject are noted.) Computer modeling is used to solve many problems. Computer modeling is widely used in science, business, etc. fields, making a person's professional opportunities endless.		
Objectives of the Course:		
Ensuring the scientific and methodological preparation of future specialists, forming in them the relevant knowledge, skills and habits for implementing teaching, introducing them to the experience gained in teaching the subject of computer modeling, and forming the ability to think logically.		
Learning Outcomes		
Formation of ideas about the goals and objectives of the subject "Computer Modeling" as a science, scientific research methods, and its relationship with other sciences. Formation of ideas about the forms of application of the subject "Computer Modeling".		
At the end of the course the student will be able to		Assessment
1	Formation of ideas about the tools of "Computer Modeling";	
2	Formation of ideas about the principles and teaching methods of the subject "Computer Modeling";	
3	Formation of ideas about the goals and objectives of the subject "Computer Modeling" among undergraduate students;	
4	Implementation of practical tasks used in the subject "Computer Modeling" among undergraduate 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 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		Computer modeling as a method of scientific cognition. Modeling methods.	
2		Advantages of computational experimentation. Concepts of models and modeling.	
3		Model characteristics. Purposes of modeling.	
4		Classification of models	
5		Classification of information models.	
6		Development of graph information model problems	
7		Modeling and systematic approach	
8		Principles of computer modeling. Relationship with other knowledge methods. Life cycle of the modeled system and applications.	
9		Classification scheme of a mathematical model according to hierarchical level and the nature of the described properties of the object	
10		Architectural scheme of an economic model. Classification of knowledge models	
11		Simulation modeling of production systems.	
12		Architecture of a complex system simulation model	
13		Computer graphics	
14		Using software packages for modeling technical systems.	
15		Areas of application of computer models Monte Carlo method	
Recommended Sources			
TEXTBOOK(S)			
- McGraw-Hill Publishing Co. ISBN: 0071255192. (2023): Simulation Modeling and Analysis (An outstanding reference for simulation students and researchers)			
- Ahmadov M.A., Mahammadli H.M. Methods of automated modeling and research of information systems. Sumgayit, 2015, 135 p			

- Alizadeh A.N., Namazov M.B., Aslanov M.S. Matlab application package and symbolic mathematics. Textbook. Baku, 2005, 280 p. Мамедов Дж.Ф. Магамедли Х.М. Моделирование ГПМ в виде конечных автоматов и исследование анализом основных свойств сети Петри / Сборник трудов по итогам XVI Международной открытой конференции «Современные проблемы информатизации в моделировании и социальных технологиях». вып.16, Воронеж: Научная книга, 2011, с.260-264.

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Fish membrionology	
Course Unit Code	ATMF -B06	
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.Racabova Sevinc Saadet	
Name of Lecturer (s)	PhD.Racabova Sevinc Saadet	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
<p>Membrionology, the study of fish embryology and development, covers the development of fish and the key biological and physiological processes at the embryonic stage. The purpose of the course is to introduce students to the study of spawning, development, and embryonic forms in different fish species. The fish membrionology course helps students learn the fundamental principles of fish embryology and allows them to gain a deeper understanding of fish development, ecology, and reproduction. This knowledge has broad applications in fish biotechnology, environmental protection, aquaculture, and fisheries.</p>		
Objectives of the Course:		
<p>The purpose of the Fish Membrionology course is to teach the developmental stages of the fish embryo, the morphogenetic and physiological foundations of these stages, as well as the factors influencing fish embryo development. This course will help students understand fish development and gain a better understanding of the ecology, evolution, and reproductive mechanisms of different fish species.</p>		
Learning Outcomes		
<p>Describe the key stages of fish embryonic development and their characteristics. Explain the morphogenetic and physiological processes occurring during fish embryo development. Identify internal and external factors that influence fish embryo growth and development. Analyze the relationship between fish embryology and species ecology, evolution, and reproduction. Apply knowledge of fish embryonic development to practical contexts in aquaculture and fishery management.</p>		
At the end of the course the student will be able to		Assessment
1	To study the diversity of spawning and development in fish.	
2	To understand the ecology and evolution of fish species.	
3	To master research methods in developmental physiology.	
4	To follow the latest studies related to fish development.	

5	To understand the role of hormones and genetic regulation in fish embryo development.		
6	To develop the ability to analyze and present data based on experiments and practical work. To cultivate professional thinking and research skills in the field of fish membrionology.		
7	To study the diversity of spawning and development in fish.		
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 and General Overview of Fish Membrionology	
2		Chapters and Key Processes of Fish Embryogenesis	
3		Cell Division and Differentiation	
4		Structural Characteristics of Fish Oocytes and Spermatozoa	
5		Early Development and Organogenesis of the Fish Embryo	
6		Morphogenetic Processes and Cell Development in Fish	
7		Genetic Control and Regulation	
8		Metabolism and Energy Changes	
9		Hormonal Influence and Development	
10		Spawning and Feeding in Fish	
11		Embryo Development and Environmental Interaction	
12		Development and Embryo Metabolism	
13		Reproduction in Fish	
14		Nesting Behaviors in Fish	
15		Research and Latest Findings	
Recommended Sources			

TEXTBOOK(S)			
1. Developmental Biology of Teleost Fishes -Yvette W. Kunz			
2. Encyclopaedia of Embryology of Fishes			
3. The Formation of the Fish-Embryo -Thomas Hunt Morgan,			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of "Philosophy".

Course Unit Title	Fisheries legislation
Course Unit Code	ATMF-B04
Type of Course Unit	Selection
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	Eynulla Baxshaliyev	
Name of Lecturer (s)	Eynulla Baxshaliyev	
Name of Assistant (s)	-	
Mode of Delivery	Full Time	
Language of Instruction	Azerbaijan	
Prerequisites	-	
Recommended Optional Program Components	-	
Course description:		
It helps the future qualified specialist to form the appropriate knowledge, skills and habits, and to ensure his scientific-theoretical and professional (practical) training so that he can independently carry out his activities.		
Objectives of the Course:		
Providing systematic knowledge to the future qualified professional, forming a correct scientific-methodological and normative view of contractual legal relations. Forming concepts based on the necessary information about the basics of fisheries law, as well as forming relevant knowledge, skills and habits that will be applied in the future.		
Learning Outcomes		
Outcome: Students will be able to identify and describe key national and international legal instruments governing fisheries, such as the Fishery Management Act, UNCLOS (United Nations Convention on the Law of the Sea) , and regional fisheries organizations .		
At the end of the course the student will be able to		Assessment
1	Explains the subject, goals and objectives, scientific research methods, and relationship with other sciences of fishery's law and the legal basis for the use of natural resources	
2	The main provisions of the law on fisheries and the legal basis for the use of natural resources explain the application of legal areas to specific economic relations in the field of economic activity.	
3	Makes logical judgments, draws conclusions, and justifies 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 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	Skills to analyze, summarize, and apply relevant information for professional purposes;	
10		
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents			
Week	Chapter	Topics	Exam
1		General characteristics of fisheries law. Basic concepts, objects and features.	
2		Legislation of the Republic of Azerbaijan on fishing	
3		Basic principles of state policy in the field of fisheries	
4		Forms of use of fish and other aquatic bioresources	
5		Forms of hunting of fish and other aquatic bioresources.	
6		Aquaculture	
7		Acquisition of the right to use fish and other aquatic biological resources	
8		Duties of the state in the field of fish conservation and aquaculture	
9		Trade in fish products	
10		Increase, restore and protect fish and other aquatic bioresources	
11		Protection of the habitat of fish and other aquatic bioresources	
12		Fisheries cadastre of fishing water bodies	
13		Basic principles of economic regulation of fisheries	
14		International cooperation on the increase, use and protection of fish and other aquatic bioresources in the Caspian Sea	
15		Dispute resolution and liability for violations of fishing legislation	
<p>Recommended Sources</p> <p>TEXTBOOK(S)</p> <p>"The Law of the Sea" by R.R. Churchill and A.V. Lowe</p> <p>"Fisheries Management in the Context of the Law of the Sea" by David L. VanderZwaag</p> <p>"The International Law of Fisheries: A Framework for Sustainable Development" by D. E. L. Huppert</p> <p>"Fisheries Management and Conservation: A Guide to the Implementation of the FAO Code of Conduct for Responsible Fisheries" by Jeffrey A. T. Foran and Valerie L. LaCroix</p>			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Methods for calculating bioresources
Course Unit Code	ATMF-B03
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	2
Semester when the course unit is delivered	2
Course Coordinator	Ahmadova Konul
Name of Lecturer (s)	Ahmadova Konul
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
The course "Bioresources Calculation Methods" teaches students modern calculation methods designed for the quantitative and qualitative assessment of various bioresources - natural resources of plant, animal and microorganism origin. The course explains the use of statistical and model-based approaches, field observations, biomass and population dynamics models, as well as geographic information systems (GIS) and remote sensing technologies.	
Objectives of the Course:	
The main objective of the subject is to provide students with tangible practical skills for the sustainable management of bioresources and the assessment of ecosystem services, and to	

develop their field-based data analysis and decision-making skills.			
Learning Outcomes: Will be able to explain the concept of bioresources and their economic and ecological importance. Will be able to differentiate and apply methods for inventorying and evaluating various bioresources.			
At the end of the course the student will be able to		Assessment	
1	Will acquire the ability to perform calculations based on biomass and population models.		
2	Will be able to work with software for statistical analysis and data processing (e.g. R, Excel, ArcGIS).		
3	Will be able to perform spatial analysis of bioresources using GIS and remote sensing technologies.		
4	Will be able to evaluate global and local bioresource management policies and make proposals in accordance with the principles of sustainability.		
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		Bioresource concept and classification	
2		Statistical assessment of bioresources: basic concepts	
3		Biometric measurements and field research methods	
4		Population dynamics models	
5		Methods for calculating biomass and productivity	
6		Quantitative and qualitative assessment of ecosystem services	
7		Methods for calculating forest bioresources	
8		Methods for assessing aquatic bioresources	
9		Assessment of soil bioresources and soil maps	
10		Assessment of plant resources: flora bioresources	
11		Statistical and spatial analysis of animal bioresources	
12		The role of GIS technologies in assessing bioresources	
13		Remote sensing and analysis of satellite images	
14		International standards and FAO methodology in bioresource management	
15		Models for sustainable management of bioresources and decision-	

		making	
Recommended Sources			
TEXTBOOK(S)			
1. – Begon, M., Townsend, C.R., Harper, J.L. – <i>Ecology: From Individuals to Ecosystems</i> . 1996			
2. Krebs, C. J. – <i>Ecological Methodology</i> . 1999			
3. Bonan, G. B. – <i>Ecological Climatology: Concepts and Applications</i> . 2002			
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			
<ul style="list-style-type: none"> • 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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Hydrochemistry
Course Unit Code	ATMF -B02
Type of Course Unit	Selective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	3

Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Abdullayeva Reyhan Kamil qızı
Name of Lecturer (s)	Abdullayeva Reyhan Kamil qızı
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
<p>The course "Hydrochemistry" is intended for students of the natural sciences. This subject studies the chemical properties of natural waters, methods of their chemical analysis. 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.</p>	
Objectives of the Course:	
<p>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..</p>	
Learning Outcomes	
<p>Define hydrochemistry and explain its significance in aquatic ecosystems, environmental science, and water management. Identify major chemical components of natural waters (cations, anions, gases, nutrients) and describe their sources and interactions. Classify natural waters based on their chemical composition (e.g., freshwater, brackish, marine, polluted water). Explain the water-rock interaction processes such as dissolution, precipitation, ion exchange, and weathering.</p>	
At the end of the course the student will be able to	
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, focusing on the regional hydrochemical characteristics of Azerbaijan;
3	To develop students' practical skills in the chemical analysis of water;
4	To teach students how to solve problems involving the application of hydrochemistry.
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 tasks of hydrochemistry	
2		Basic physical and chemical properties of water	
3		The 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 contained in water	
9		Microelements contained in 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 wetlands 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 analyses.	
16		Metal toxins and their mechanism of action	
17		Effects of water pollution on living things: Chemical effects on the body	
18		Spread and accumulation of chemicals in running and stagnant waters	
19		Metal toxins and their mechanism of action	
20		Source of water pollution: mining of metal deposits	
21		Water Pollution: Oil Spills, Consequences, and Cleanup Methods	
22		Water pollution: Heavy and light industrial waste	
23		Sources of pollution of water bodies: Pesticides, herbicides, their routes of entry into water bodies and mechanisms of action	

Recommended Sources

TEXTBOOK(S)

Stumm, W., & Morgan, J. J. (1996). Aquatic Chemistry: Chemical Equilibria and Rates in Natural Waters (3rd ed.). Wiley-Interscience.

A foundational text in water chemistry, covering equilibrium, kinetics, and environmental applications.

Drever, J. I. (1997). The Geochemistry of Natural Waters: Surface and Groundwater Environments (3rd

ed.). Prentice Hall.
 Focuses on geochemical processes affecting water chemistry.
 Langmuir, D. (1997). Aqueous Environmental Geochemistry. Prentice Hall.
 Covers thermodynamics, kinetics, and geochemical modeling of aqueous systems.
 Hem, J. D. (1985). Study and Interpretation of the Chemical Characteristics of Natural Water (3rd ed.).
 U.S. Geological Survey Water-Supply Paper 2254.

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 water bio-resources and aquaculture, Department of “Natural sciences”.

Course Unit Title	Anatomy and physiology of fish
Course Unit Code	ATMF -B06
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. Racabova Sevinc Saadet
Name of Lecturer (s)	PhD. Racabova Sevinc Saadet
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	
<p>The subject "Fish Anatomy and Physiology" is a field that thoroughly studies the structure and functions of fish. It is taught to undergraduate students. In the lectures of this course, students are taught about the taxonomic age of fish in the world and in Azerbaijan, the history, branches, anatomy, and physiology of fish, the diversity of fish based on their biology and lifestyle, the characteristics of the aquatic environment as a fish habitat, ecological groups of fish based on their adaptation to specific habitats (marine fish, freshwater fish, migratory fish, and brackish water fish), as well as the systematics and distribution of fish.</p>	
Objectives of the Course:	
<p>The aim of the course "Fish Anatomy and Physiology" is to provide students with knowledge about the structural features of fish depending on their living conditions, their ecological groups, distribution, intra- and interspecies interactions, systematics, skeleton, internal organs, their anatomy and physiology, reproduction, productivity, developmental stages, feeding, and growth rate. Additionally, the course aims to explain the existing fish resources in various water bodies and their significance.</p>	
Learning Outcomes	
<p>Describe the taxonomy and classification of major fish groups, including cartilaginous and bony fishes.</p> <p>Explain the structural organization of fish body systems (skeletal, muscular, circulatory, respiratory, digestive, excretory, nervous, and reproductive).</p> <p>Understand the physiological processes that regulate vital functions in fish, such as respiration, osmoregulation, circulation, and metabolism.</p> <p>Identify the adaptations of fish to different aquatic environments, including freshwater, marine, and brackish ecosystems.</p> <p>Analyze the ecological roles of fish in aquatic ecosystems and their interactions with abiotic and biotic environmental factors.</p>	
At the end of the course the student will be able to	Assessment

1	To familiarize students with general concepts related to fish classification, structure, and biology, as well as the main hydrobiological processes and patterns occurring in aquatic ecosystems;	
2	To develop students' knowledge about the systematics, biology, geographical distribution, and fishing status of commercially important fish species, and to teach the impact of abiotic and biotic factors on fish and their adaptation features;	
3	To introduce students to the fish fauna of Azerbaijan's inland water bodies and the Caspian Sea, as well as rare and endangered fish species included in the "Red Book"; To enhance knowledge about fish species introduced into Azerbaijan's waters and their biology, and to develop the ability to assess their impact on the ecosystem.	
4	To familiarize students with general concepts related to fish classification, structure, and biology, as well as the main hydrobiological processes and patterns occurring in aquatic ecosystems;	

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. Course objectives and tasks. Research subjects. Distribution of fish	
2		Taxonomy of cartilaginous fish	
3		Taxonomic structure of bony fish	
4		Circulatory system, osmoregulation, and excretion	
5		Digestive system of fish	
6		Fish interactions with biotic factors of the environment	
7		Fish feeding and food competition	
8		Fish reproduction	
9		Functions of fish skin. Skin derivatives in fish	
10		Electric phenomena in the fish body	
11		Physiology of the nervous system and neural activity. Sensory organs	

		in fish	
12		Metabolism and energy. Physiology of respiration	
13		Fish migration	
14		Geographical distribution of fish and related patterns	
15		Muscular system and swimming in fish	
Recommended Sources TEXTBOOK(S)			
<ol style="list-style-type: none"> "Anatomy of Fishes"-K. Mahajan "Textbook of Fish Biology and Fisheries"-B. R. Khanna and H.R. Singh "Ichthyology"-Authors: Carl E. Bond (latest edition revised by Robert M. Hayden) 			
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			
<ul style="list-style-type: none"> 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