MODULE HANDBOOK

BSc in Computer Science

CONTENTS

Computer Science bachelor program, Department of "History"

Course Unit Title	History of Azerbaijan
Course Unit Code	ÜF-B01
Type of Course Unit	Compulsory
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Ph.D. Gunel Rahimli Ashraf
Name of Lecturer(s)	Ph.D. Gunel Rahimli Ashraf
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

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

Course Objectives:

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

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

2	demonstrate logical and consistent knowledge	1, 2
3	write a research paper on the topic in accordance with the methods of scientific research	1, 2
4	connect historical events with modern times, to draw conclusions	1, 2
5	apply the methods of comparative analysis, analysis and synthesis	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	3
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	2
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	2
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	2
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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 SEMINAR 1	
2		ANCIENT STATES OF AZERBAIJAN. MANNA, ATROPATENA, ANCIENT ALBANIA SEMINAR 2	

3		AZERBAIJAN IN THE III-VII CENTURIES SEMINAR 3	
4		AZERBAIJAN UNDER THE ARAB CALIPHATE SEMINAR 4	
5		AZERBAIJAN IN THE 9TH TO THE EARLY 13RD CENTURIES SEMINAR 5	
6		AZERBAIJAN IN THE 14TH CENTURY TO 15TH CENTURIES SEMINAR 6	
7		AZERBAIJAN SAFAVID STATE SEMINAR 7	
8		KHANATES OF AZERBAIJAN SEMINAR 8	
9		AZERBAIJAN IN THE 19TH CENTURY SEMINAR 9	
10		AZERBAIJAN IN THE FIRST DECADES OF THE 1900s SEMINAR 10	
11		AZERBAIJAN DEMOCRATIC REPUBLIC (1918-1920) SEMINAR 11	
12		AZERBAIJAN IN THE 1920-1930s SEMINAR 12	
13		AZERBAIJAN DURING THE WORLD WAR II AND AFTER THE WAR SEMINAR 13	
14		INDEPENDENT AZERBAIJAN REPUBLIC (1991- 2020s.) SEMINAR 14	
15		THE SECOND GARABASH WAR AND THE VICTORY OF AZERBAIJAN SEMINAR 15	

Recommended Sources

TEXTBOOK(S)

1. History of Azerbaijan. Ed. M.Abdullayev. Baku, 2015, 2019 412 p.
2. The History of the Caucasian Albanians" by Movses Khorenatsi (translated by RW Thomson)
3. Sources on the history of Azerbaijan, edited by SSAliyarov and YMMahmudov. Baku, Chirag, 2007. 400 p.
4. The Politics of Culture in Soviet Azerbaijan, 1920-40, Audrey Altstadt, Published January 12, 2018 by Routledge
5. The Azerbaijani Turks: Power and Identity under Russian Rule, Audrey Altstadt, Publisher Hoover Institution Press; 1992
6. A. M. Shikhsaidov. Caucasian Albania and Its Writing.2001

7. Gasimov X. Azerbaijani culture in the Middle Ages. Baku, Azpoligraf, 2008
8. Aliyev K. Aliyeva F. Azerbaijan in the Antique Period. Baku, 1997
9. Velikhanli NM. Arab geographers-travelers of the 9th-12th centuries about Azerbaijan. Baku, 1974.
10. Velikhanli NM Arab Caliphate and Azerbaijan. Baku, 1993.
11. Mammadzade MB National Azerbaijani movement. B., 1922

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

Computer Science bachelor program, 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	1st year
National Credits	
Number of ECTS Credits Allocated	7
Theoretical (hours/week)	
Practice (hours/week)	7
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Jala Asgarova
Name of Lecturer(s)	Jala Asgarova
Name of Assistant(s)	-
Mode of Delivery	Face to face
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.

Course Objectives:

The aims of the course are:

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

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	The student will grow in their ability to use English to communicate effectively with others in all disciplines.	1, 2
2	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	1, 2

	announcements.	
3	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.	1, 2
4	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.	1, 2
5	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.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	3
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	2
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	2
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	2
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

	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 skills; 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 skills; 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 skills; Grammar: Comparatives; Pronunciation; Unit Assignment	
25		Unit 5. Business-Reading 1; Reading skills; 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 skills; 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 skills; Work with the video	
45		Unit8. Public Health-Reading 2; Critical Thinking Strategy; Vocabulary Skill	
46		Unit8. Public Health-Writing skills; Grammar Adverbs of manner and degree; Unit assignment	
47		Unit8. Public Health: Listening 1; Note-taking Skill, Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
48		Unit8. 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		PREPARATION FOR FINAL	

Recommended Sources

TEXTBOOK(S)

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
3. English Vocabulary in Use Elementary Third Edition/Michael McCarthy, Felicity O'Dell/ Cambridge University Press2017
4. Basic Oxford Practice Grammar / Norman Coe, Mark Harrison, Ken Paterson/ Oxford University Press 2019
5. Reading & Vocabulary Development 1: Facts & Figures, Fourth Edition / Patricia Ackert and Linda Lee

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.
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ECTS allocated based on Student Workload

Total Workload	**210**
Total Workload/30(h)	**210/30**
ECTS Credits of the Course	**7**

Computer Science bachelor program, 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	1st year
National Credits	
Number of ECTS Credits Allocated	8
Theoretical (hours/week)	
Practice (hours/week)	8
Laboratory (hours/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	Face to face
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.

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

Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	The student will grow in their ability to use English to communicate effectively with others in all disciplines	1, 2
2	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.	1, 2
3	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.	1, 2
4	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.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	2
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	2
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	2
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	2
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	5

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

Course Contents

	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 impressions accurate? Note-taking Skill: to summarize a lecture Listening 1: The psychology of first impressions	
6		**Unit 1.** Sociology. Are first impressions accurate? Listening Skill: Listening for main ideas. Listening 2: A review of books about first impressions.	
7		**Unit 1.** Sociology. Are first impressions accurate? Work with the video: Interview mistakes. Vocabulary skill: suffixes. Grammar: Auxiliary verbs: do, be, have	
8		**Unit 1.** Sociology. Are first impressions 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 defense 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 behavior?** Note-taking skill: A mind map to note opinions Listening 1: Targeting children with advertising	
30		**Unit 4. Marketing. How does advertising affect our behavior?** Listening skill: Fact and opinion Listening 2: The influence of online ads	
31		**Unit 4. Marketing. How does advertising affect our behavior?** Vocabulary skill: Context clues to identify meaning Grammar: Modals expressing attitude	
32		**Unit 4. Marketing. How does advertising affect our behavior?** 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: References 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 model. 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

TEXTBOOK(S)

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
3. English Vocabulary in Use Third Edition/Michael McCarthy, Felicity O'Dell/ Cambridge University Press2017
4. Basic Oxford Practice Grammar / Norman Coe, Mark Harrison, Ken Paterson/ Oxford University Press 2019
5. Reading & Vocabulary Development 1: Facts & Figures, Fourth Edition / Patricia Ackert and Linda Lee
6. Essential Grammar in Use Fourth edition/ Raymond Murphy/ Cambridge University Press 2015

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	
Total Workload	**240**
Total Workload/30(h)	**240/30**
ECTS Credits of the Course	**8**

Computer Science bachelor program, Department of "Azerbaijani Language and Literature"

Course Unit Title	Business and academic communication in the Azerbaijani language
Course Unit Code	ÜF-B03
Type of Course Unit	Compulsory
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	
Practice (hours/week)	3
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Alesgarova Solmaz Hashim

Name of Lecturer(s)	Alesgarova Solmaz Hashim
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani
Prerequisites	-
Recommended Optional Program Components	-

Course description:
The subject "Business and Academic Communication in Azerbaijani" emerged based on a certain need and demand.Correct and fluent use of the Azerbaijani language in accordance with the requirements of the times in the context of globalization, as well as fluent speech in this language, regardless of specialization

Course Objectives:
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.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	To acquire information about the Azerbaijani language and the state care shown to it in the context of globalization. To learn how to prepare a presentation on the topic of decrees and orders on the state language, “Great Leader Heydar Aliyev and the Azerbaijani language”; To know the goals and objectives of the subject “Business and Academic Communication in the Azerbaijani Language”. To acquire knowledge about the forms and functions of communication, levels of communication	1, 2
2	To master the role of auxiliary parts of speech in the academic communication process; to study the role of oral and written communications, as well as the requirements for speech: accuracy, precision, clarity, fluency, purity, conciseness, simplicity, richness, coherence, and other important issues of speech at the level of modern requirements. To know what communication rhetoric consists of, the styles of literary language, the active and passive lexicon of the Azerbaijani literary language. To master literary language and communicability, types of communicability, communication and communicative strategies and creative technologies in communicability.	1, 2
3	To study the culture of listening and the essence of listening as a type of communication. To understand the importance of listening and attention, forms of listening, and improving listening skills; to acquire information about communication culture, conversational ethics, and address etiquette; to know the uniqueness of organized speech (lecture, report, speech, spontaneous speech); to create business communication orally	1, 2
4	To learn information and rules about the business style of the modern Azerbaijani language; To enrich knowledge about the role of letters in business communication, electronic and online communications; To create written business communication.	1, 2
5	To learn information about the language of official business documents; to acquire information about the types and forms of business communications, as well as their language and style. To learn the purity of the Azerbaijani language in business communication, the essence of observing spelling rules and sentence structure. To	1, 2

	acquire theoretical and practical work on business rhetoric. Be able to prepare written and oral presentations in the specialty in Azerbaijani.	

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	2
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	2
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	2
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	2
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		SEMINAR 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 state language of Azerbaijan SEMINAR 2.Speech culture and the art of oratory. The relationship of the art of oratory with other sciences	
2		SEMINAR 3. Forms of speech. Written speech and oral speech. Differences between written speech and oral speech. Features of oral speech. Improving oral speech skills	
3		SEMINAR 4. Communication. Business communication culture SEMINAR 5. Discussion and listening culture. Ethical issues of speech. Speech etiquette	

4		SEMINAR 6. Expressive actions that complement oral speech. Body language. Mimicry, gestures	
5		SEMINAR 7. Literary language. Norms of literary language. Phonetic norm. Observance of orthographic norms in academic and business communication. Abbreviations. Punctuation marks SEMINAR 8. Observance of orthoepic norms in academic and business communication. Expressiveness of speech. Stress, intonation	
6		SEMINAR 9. Lexical norm. Expectation of lexical norm in academic and business communication. Use of terms, synonyms, idioms, etc.	
7		Seminar 10. Grammatical norms. Observing grammatical norms in academic and business communication. Inversion. Using descriptive and expressive language tools in academic speech (ellipsis, rhetorical questions, exclamation, etc.) Seminar 11. Auxiliary parts of speech, their stylistic possibilities in speech	
8		Seminar 12. Types of speech: dialogical speech, monological speech, polylogical speech	
9		SEMINAR 13. Basic requirements for cultural speech SEMINAR 14. Style and stylistics. Functional styles of the Azerbaijani language	
10		Seminar 15. Scientific style. Rules for written and oral presentation of lectures, scientific papers, essays, scientific reports, summaries, etc.	
11		SEMINAR 16. Journalistic style. Preparation of academic and business articles in the journalistic style SEMINAR 17. Official-business style: business correspondence, rules for writing business documents	
12		SEMINAR 18. Preparation of business advertisements and billboards	
13		SEMINAR 19. Epistolary style: rules of formal and electronic correspondence. Business correspondence SEMINAR 20. Areas of Oratory	
14		SEMINAR 21. Academic oratory. Business rhetoric. Correct construction of business and academic speech	
15		SEMINAR 22. Procedure and content of CV writing. Questionnaires and surveys. Rules for preparing project questionnaires SEMINAR 23. Business meetings. Organization of business meetings. Participation in business meetings	

Recommended Sources

TEXTBOOK(S)

1. Khalilov Buludkhan. Business and Academic Communication in Azerbaijani. Baku, 2021
2. Shiriyev Fikret. Speech culture and communication of the Azerbaijani language. Baku, 2021
3. Babayev Adil. Azerbaijani language and speech culture. Baku, 2011
4. Mammadli N. Business and academic communication in Azerbaijani. Baku, 2021

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	
Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Philosophy"

Course Unit Title	Philosophy
Course Unit Code	ÜFS-B04
Type of Course Unit	Elective
Level of Course Unit	2nd year
National Credits	

Number of ECTS Credits Allocated	3
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Mustafayeva Nureddinovna Gunel
Name of Lecturer(s)	Mustafayeva Nureddinovna Gunel
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

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

Course Objectives:
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

At the end of the course the student will be able to		Assessment
1	To form modern approaches to the study of natural and social phenomena, the ability to collect and analyze empirical data, the rules for compiling scientific work, and the ability to summarize and analyze research results.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	3
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	3
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3

5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	2
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

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

Recommended Sources

TEXTBOOK(S)

1. Arendt Hannah, “Human Condition”, The University of Chicago Press, Chicago & London, 2d edition, 1998.
2. Arendt Hannah, "The origins of totalitarianism", A Harvest Book Harcourt Brace & Company, San Diego NY London, 1979.
3. Becker Gary S., "Human Capital: A THEORETICAL AND EMPIRICAL ANALYSIS, WITH SPECIAL REFERENCE TO EDUCATION", The University of Chicago Press Ltd., London, 1993.
4. Aristotle, Politics.
5. Beebee, Helen, Free Will: An Introduction, Palgrave, 2013.
6. Cassin Barbara, Dictionary of Untranslatables: A Philosophical Lexicon, Princeton University Press 2014.
7. Craig Edward, "Philosophy: A very short Introduction", Oxford University Press Inc., New York 2002
8. Eco Umberto, "Eternal Fascism: Fourteen Ways of Looking at a Blackshirt," Writing in New York Review of Books, 22 June 1995, pp. 12-15.
9. Esping-Andersen Gosta, "The three worlds of welfare capitalism", Princeton University Press, Princeton New Jersey, 1990.
10. Fresco Jacque, “The best money can't buy: Beyond Politics, Poverty and War”, Global Cyber Visions, 2002.
11. Fullerton George Stuart, An Introduction to Philosophy, The MacMillan Company, London: Macmillan & Co., Ltd 1915.
12. Habermas Jurgen, "The concept of human dignity and the realistic utopia of human rights", Journal Compilation Metaphilosophy LLC and Blackwell Publishing Ltd., Vol. 41 #4, July 2010.
13. Hayek FA, The Road to Serfdom, University of Chicago Press, 1944.
14. Thomas Hobbes, Leviathan.
15. David Hume, "Treatise of Human Nature" (Book I, Section VI "Of Personal Identity"), ed. 1896, Oxford.
16. Krugman Paul, Venables Anthony J., "Globalization and Inequality of Nations", The Quarterly Journal of Economics, Vol. 110, No. 4, November, 1995.
17. Ray Kurzweil, The Singularity is Near: when humans transcend biology, Penguin Books Ltd., London, 2005.
18. John Locke, "An Essay Concerning Human Understanding" (Chapter XXVII "Of Identity and Diversity"), 2nd Edition.
19. John Locke, Second Treatise of Government.
20. Ludwig von Mises,Bettina Bien Greaves(Editor), "Human Action: A treatise on Economics", Liberty Fund Inc., 2010.
21. Machiavelli, "The Prince".
22. Marx Karl “Capital, A new abridgement”, edited by David McLellan, Oxford University Press Inc., NY, 2008.
23. McGinn Colin, Consciousness and Its Objects, Clarendon Press, Oxford, 2004.
24. McTaggart J. Ellis, “The Unreality of Time”, Mind, Volume XVII, Issue 4, 1 January 1908, Pages 457–474.
25. Perry John, "Personal Identity", University of California Press, 1975.
26. Piketty Thomas, "Capital in the twenty-first century", President and Fellows of Harvard College, 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	
Total Workload	**90**
Total Workload/30(h)	**90/30**
ECTS Credits of the Course	**3**

Computer Science bachelor program, Department of "Philosophy"

Course Unit Title	Introduction to Multiculturalism
Course Unit Code	ÜFS-B04
Type of Course Unit	Elective
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	3

Course Coordinator	Elvin Khudaverdiyev Elshan
Name of Lecturer(s)	Elvin Khudaverdiyev Elshan
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
Introduction to Multiculturalism is a course that explores the coexistence and interaction of different cultures, ethnic groups, and social identities. This course introduces students to the values, customs, and worldviews of different cultures.

Course Objectives:
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

At the end of the course the student will be able to		Assessment
1	The outcomes of the Introduction to Multiculturalism course include understanding cultures, increasing empathy and respect, developing tolerance, increasing social knowledge, strengthening communication skills, promoting integration and social harmony, and developing critical thinking skills.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	3
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	2
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	2

7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

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

Recommended Sources

TEXTBOOK(S)

1. Guliyev, R. (2015). Fundamentals of Multiculturalism.
2. Khudaverdiyev Elvin - Azerbaijan's multiculturalism policy (2023)
3. Mammadov, A. (2018). Multiculturalism in Azerbaijani society.
4. Aliyeva, S. (2020). Cultural diversity and social harmony.
5. Kymlicka, W. (1995). Multicultural Citizenship: A Liberal Theory of Minority Rights.
6. Taylor, J. (1992). Multiculturalism and the Politics of Recognition.
7. Parekh, B. (2000). Rethinking Multiculturalism: Cultural Diversity and Political Theory.

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

Course Policies

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

ECTS allocated based on Student Workload

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

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

Course description:

Sociology is a field of study that encompasses the study of social structure, social institutions, social change, and human behavior in a social context. This subject teaches students to analyze social phenomena with a scientific approach and gain a deeper understanding of the events that occur in society. Sociology studies the behavior of people in the social world, the formation of social relationships, and the social structures of society. The main goal of the subject is to explain to students the role of social institutions (family, religion, education, economics, and politics) in the formation of society, to help them understand how social processes occur, and the impact of social changes on individuals and groups.

Through this course, students learn about social dynamics, social norms, and social control mechanisms in society, as well as gain knowledge about current topics such as social inequality, social stratification, urbanization, gender, and ethnic issues. In addition, students learn sociological research methods and acquire the skills to analyze social problems on a scientific basis.

In addition to developing critical and analytical thinking skills, the subject of sociology provides students with theoretical and practical knowledge essential for working 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

Course Objectives:

Sociology is a field of study that encompasses the study of social structure, social institutions, social change, and human behavior in a social context. This subject teaches students to analyze social phenomena with a scientific approach and gain a deeper understanding of the events that occur in society. Sociology studies the behavior of people in the social world, the formation of social relationships, and the social structures of society. The main goal of the subject is to explain to students the role of social institutions (family, religion, education, economics, and politics) in the formation of society, to help them understand how social processes occur, and the impact of social changes on individuals and groups.

Through this course, students learn about social dynamics, social norms, and social control mechanisms in society, as well as gain knowledge about current topics such as social inequality, social stratification, urbanization, gender, and ethnic issues. In addition, students learn sociological research methods and acquire the skills to analyze social problems on a scientific basis.

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

At the end of the course the student will be able to		Assessment
1	They will develop the ability to analyze social phenomena and processes with a scientific approach.	1, 2
2	They will be able to conduct empirical research using social research methods (surveys, interviews, observation, etc.).	1, 2
3	They will approach social problems critically and develop analytical thinking skills to solve them.	1, 2
4	They will analyze the relationships between social groups and individuals and evaluate the functioning of social institutions.	1, 2
5	They will be able to apply the theoretical knowledge they have acquired in social policy, business, media, and other fields.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	3
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	2
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	2

7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1. Sociology as a science	
2		SEMINAR 1	
3		LECTURE 2. Society as a complex social phenomenon	
4		SEMINAR 2	
5		LECTURE 3. Personality as a social system	
6		SEMINAR 3	
7		LECTURE 4. The concept of social structure	
8		SEMINAR 4	
9		LECTURE 5. Sociology of social ethnic relations	
10		SEMINAR 5	
11		LECTURE 6. Social territorial associations	
12		SEMINAR 6	
13		LECTURE 7. Religion and sociology	
14		SEMINAR 7	
15		Education and sociology SEMINAR 8	

Recommended Sources

TEXTBOOK(S)

1. Giddens, A. (2009). Sociology. Polity Press.
2. Macionis, JJ (2018). Sociology. Pearson.
3. Ritzer, G. (2021). Sociological Theory. McGraw-Hill.
4. Haralambos, M., & Holborn, M. (2013). Sociology: Themes and Perspectives. Collins.
5. Berger, PL, & Luckmann, T. (1966). The Social Construction of Reality: A Treatise in the

Sociology of Knowledge. Penguin Books
6. Durkheim, É. (1897). Suicide: A Study in Sociology. The Free Press.
7. Weber, M. (1978). Economy and Society: An Outline of Interpretive Sociology. University of California Press.
8. Mills, CW (1959). The Sociological Imagination. Oxford University Press.
9. Collins, R. (1994). Four Sociological Traditions. Oxford University Press.
10. Bauman, Z. (2000). Liquid Modernity. Polity Press.

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

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

Computer Science bachelor program, 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	Elective
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Arzu Hajiyeva Bahruz
Name of Lecturer(s)	Arzu Hajiyeva Bahruz
Name of Assistant(s)	-
Mode of Delivery	
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

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

Course Objectives:
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

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.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	3
2	ability to apply computer science theory and software engineering fundamentals	2

	to create computational solutions	
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	2
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

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

13		LECTURE 7. Legal facts, violations of law and legal liability	
14		SEMINAR 7	
15		LECTURE 8. Areas of law: fundamentals of constitutional, administrative and criminal law	

Recommended Sources

TEXTBOOK(S)

1. Constitution of the Republic of Azerbaijan
2. SS Allahverdiyev. Fundamentals of the Constitution and Law of the Republic of Azerbaijan. Textbook. Baku, 2012
3. VV Lazarev. General law and theory of state. Baku, 2007
4. SS Allahverdiyev, Fundamentals of the Constitution and Law of the Republic of Azerbaijan. Textbook. Baku, 2010
5. Frederick Bastiat, Law, Baku, 2007
6. Constitutional Law of the Republic of Azerbaijan "On Normative Legal Acts", Baku, 2011

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

Course Policies

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

ECTS allocated based on Student Workload

Total Workload	**90**

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

Computer Science bachelor program, Department of "Philosophy"

Course Unit Title	Logic
Course Unit Code	ÜFS-B04
Type of Course Unit	Elective
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Gunel Mustafayeva Nureddinovna
Name of Lecturer(s)	Gunel Mustafayeva Nureddinovna
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-
Course description: The course offers students an approach to logic as a branch of philosophy through brain work, language, deductive and inductive logic, the art of reasoning, and classroom discussions. The main focus is on the study of the mechanism of argumentation and expression of ideas. Special attention is paid to logical fallacies. The problems and challenges of the modern era will also be analyzed and discussed.	
Course Objectives: Students should leave this course with an understanding of the basic 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		
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, andThe use of ρ in other philosophical and humanistic disciplines	1, 2
2	student ideas in philosophical schoolsmust be able to freely analyze and compare them	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	4
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	4
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	3
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	3
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		Lesson 1. Introduction to Course. Logic as an area of philosophy. The purpose of the course. The work of the brain	
2		SEMINAR 1. Introduction to Course. Logic as an area of philosophy. The purpose of the course. The work of the brain	
3		Lesson 2. Language and Reasoning: classification, definitions, propositions	
4		SEMINAR 2. Language and Reasoning: classification, definitions, propositions	

5		Lesson 3. Formal and Informal Logic (I)	
6		SEMINAR 3. Formal and Informal Logic (I)	
7		Lesson 4. Formal and Informal Logic (II)	
8		SEMINAR 4. Formal and Informal Logic (II)	
9		Lesson 5. Argumentation theory and philosophy. Logical fallacies. The art of asking questions (I)	
10		SEMINAR 5. Argumentation theory and philosophy. Logical fallacies. The art of asking questions (I)	
11		Lesson 6. Argumentation theory and philosophy. Logical fallacies. The art of asking questions (II)	
12		SEMINAR 6. Argumentation theory and philosophy. Logical fallacies. The art of asking questions (II)	
13		Lesson 7. The art of asking questions	
14		SEMINAR 7. The art of asking questions	
15		SEMINAR 8. Long-term thinking, planning	

Recommended Sources

TEXTBOOK(S)

1. The Art of Reasoning, The Introduction to Logic and Critical Thinking, 4th edition, David Kelley, 2014
2. Thinking Fast and Slow, Daniel Kahneman, 2013
3. Logic Primer - 2nd Edition, byColin Allen,Michael Hand
4. Logic. An Introduction to Elementary Logic - 2nd Edition, byColin Allen,Michael Hand
5. Philosophy of Logic, 1986, byW.V. QuineThe Tractatus Logico-Philosophicus, Wittgenstein, 1921

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

Computer Science bachelor program, Department of "Philosophy"

Course Unit Title	Ethics and Aesthetics
Course Unit Code	ÜFS-B04
Type of Course Unit	Elective
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Gunel Mustafayeva Nureddinovna
Name of Lecturer(s)	Gunel Mustafayeva Nureddinovna
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English

Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject "Ethics and Aesthetics" 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 the interaction of morality and society.

Course Objectives:
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

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; creates a complete picture of modern approaches to the study of ethical knowledge, the essence of morality, and classifies its main functions; emphasizes the importance of maintaining objectivity in the study of the history of ethical thought; applies the acquired theoretical knowledge in professional and everyday activities.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	3
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	2
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	2
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2

10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1. Ethics in the system of philosophical knowledge	
2		SEMINAR 1. Ethics in the system of philosophical knowledge	
3		LECTURE 2. The formation of ethical thought. The main stages in the development of ethical teachings	
4		SEMINAR 2. The formation of ethical thought. The main stages in the development of ethical teachings	
5		LECTURE 3. Ethical ideas in the history of public opinion in Azerbaijan	
6		SEMINAR 3. Ethical ideas in the history of public opinion in Azerbaijan	
7		LECTURE 4. The essence and functions of morality	
8		SEMINAR 4. The essence and functions of morality	
9		LECTURE 5. Main categories of ethics	
10		SEMINAR 5. Main categories of ethics	
11		LECTURE 6. Moral sense and moral practice	
12		SEMINAR 6.Moral sense and moral practice	
13		LECTURE 7. Applied ethics and its scope	
14		SEMINAR 7. Applied ethics and its scope	
15		LECTURE 8. Ethical principles in professional activity	

Recommended Sources

TEXTBOOK(S)

1. Qizilgul Abbasova. Ethics: history, theory and practice (textbook). Baku, 2016
2. Sevinj Shahhüseynova, Ethics, Baku, 2009
3. Aristotle, Politics. Great Ethics, Baku, 2006
4. Nasiruddin Tusi, Moral Nasiri, Baku, 1989

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

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Information technology (by specialty)
Course Unit Code	ÜFS-B05
Type of Course Unit	Elective
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	1

Semester when the course unit is delivered	1
Course Coordinator	Hajiyeva Rena Javadkhan
Name of Lecturer(s)	Hajiyeva Rena Javadkhan
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, 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.

Course Objectives:
Ensuring the scientific and methodological preparation of future specialists (goals and content of Informatics training, forms of training organization, 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, forming the ability to think logically

Learning Outcomes

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	1, 2
2	Normalization of ideas about the forms of organizing computer science training	1, 2
3	Formation of ideas about the means of computer science training; Formation of ideas about the principles and teaching methods of computer science training	1, 2
4	Formation of ideas about the goals and objectives of Informatics training for undergraduate students	1, 2
5	Performing practical tasks used in the training of Informatics course for undergraduate students	1, 2
6	Monitoring and investigating the level of performance of practical tasks	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4

4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 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		LECTURE 2. Computer architecture. Assembling and disassembling a computer. Visual introduction to devices	
3		LECTURE 3. The main components of information technologies. HardWare - technical support. SoftWare - software. BrainWare - instrumental support. Main and peripheral devices of computers	
4		LECTURE 4. Practical ways to use the basic capabilities of the Word text editor. Formatting texts. Creating tables	
5		LECTURE 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		LECTURE 6. Using the graphic capabilities of Word. Drawing diagrams	
7		LECTURE 7. Word processors. Word text editor and its main capabilities. Graphic capabilities of Word text editor. Mathematical software packages.	
8		LECTURE 8. Windows operating system menus, windows. Windows Aero interface. Files and folders. Hot keys	
9		LECTURE 9. Using and practicing the standard hotkeys of the Windows operating system	
10		LECTURE 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		LECTURE 11. MS Excel spreadsheet. Cell, block, page. Creating charts. Filter and sort operations. Classification of functions in Excel. Functions of mathematical, statistical, financial, text, logical and other categories	
12		LECTURE 12. Practical application of the basic capabilities of the MS Excel spreadsheet	
13		LECTURE 13. Using database management systems in the agricultural sector. Purpose, main capabilities, objects, data types of Access DBMS	
14		LECTURE 14. Classification, architecture, types, topology of computer networks. Structure of the Internet network	
15		LECTURE 15. Classification, architecture, types, topology of computer networks. Structure of the Internet network	

Recommended Sources

TEXTBOOK(S)

1. Hajiyeva R.C. Informatics. Collection of lectures, Polygraphic and Publishing Center of the State University of Science and Technology, Baku, 2020, 180 pages.
2. Shirokova A. I., Pyshniak M. Informatics. Разработка программ на языке программирования Piton, M., 2020, 144 p.
3. Alizade M.N., Orujova T.V., Hasanova N.A. Information security. Baku, “MSV Publishing”, 2018, 388 p.
4. Informatics for economists. Учебник для бачалериата и специалитета / ed. Poliakov V. P. M.: Yurayt, 2019. 524 c.
5. Lyakhovich V.F., Molodtsov V.A., Ryzhikova N.B. Fundamentals of computer science. — M.: KnoRus, 2016. — 348 c.
6. Makarova N.B. Informatics: Textbook for universities. Publisher: Peter, 2013, 576 c.
7. Informatics and information technologies / ed. Yu.D. Romanova. — M.: Eksmo, 2011. — 544 p.
8. Prosvetov G.I. Data analysis using Excel. Tasks and solutions. — M.: Alfa-Press, 2015. — 160 c
9. Nabiullina S.N. Informatics and ICT. Course lecture. M.: Lan, 2019. 72 p.
10. Gasumova S.E. Social informatics. Textbook and practice for universities. M.: Yurayt, 2019. 284 c.

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

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Information management
Course Unit Code	ÜFS-B05
Type of Course Unit	Elective
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Ahmadova Esmira Nariman
Name of Lecturer(s)	Ahmadova Esmira Nariman
Name of Assistant(s)	-

Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

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

Course Objectives:
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

At the end of the course the student will be able to		Assessment
1	Formation of ideas about information processes; Formation of ideas about information technologies and their application areas	1, 2
2	Formation of concepts about information management; Formation of concepts about database management system and database creation	1, 2
3	Formation of ideas about spreadsheet organization technologies	1, 2
4	Computer networksformation of ideas about and the ability to use them	1, 2
5	Formation of the ability to use information technologies that are most commonly used in education and specialization	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4

9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1. Information and information processes. Information management	
2		SEMINAR 1. Information and information processes. Information management	
3		LECTURE 2. Information technologies and their application areas	
4		SEMINAR 2. Information technologies and their application areas	
5		LECTURE 3. Database management system	
6		SEMINAR 3. Database management system	
7		LECTURE 4. Database organization in MS Access environment	
8		SEMINAR 4. Database organization in MS Access environment	
9		LECTURE 5. Spreadsheet organization technologies	
10		SEMINAR 5.Spreadsheet organization technologies	
11		LECTURE 6. Using information resources and services in the Internet environment	
12		SEMINAR 6.Using information resources and services in the Internet environment	
13		LECTURE 7. Geographic information systems	
14		SEMINAR 7.Geographic information systems	
15		LECTURE 8. Using other applications SEMİNAR 8. Using other applications	

Recommended Sources

TEXTBOOK(S)

1. Hajiyeva R.C. Informatics. Collection of lectures, Polygraphic and Publishing Center of the State University of Science and Technology, Baku, 2020, 180 pages.
2. Shirokova A.I., Pyshniak M. Informatics. Разработка программ на языке программирования Piton, M., 2020, 144 p.
3. Alizade M.N., Orujova T.V., Hasanova N.A. Information security. Baku, “MSV Publishing”, 2018, 388 p.
4. Informatics for economists. Учебник для бачалериата и специалитета / ed. Poliakov V. P. M.: Yurayt, 2019. 524 c.
5. Lyakhovich V.F., Molodtsov V.A., Ryzhikova N.B. Fundamentals of computer science. — M.: KnoRus, 2016. — 348 c.

6. Makarova N.B. Informatics: Textbook for universities. Publisher: Peter, 2013, 576 c.
7. Informatics and information technologies / ed. Yu.D. Romanova. — M.: Eksmo, 2011. — 544 p.
8. Prosvetov G.I. Data analysis using Excel. Tasks and solutions. — M.: Alfa-Press, 2015. — 160 c
9. Nabiullina S.N. Informatics and ICT. Course lecture. M.: Lan, 2019. 72 p.
10. Gasumova S.E. Social informatics. Textbook and practice for universities. M.: Yurayt, 2019. 284 c.
11. Abasov B. Microsoft Access database management system. Baku, 2009.
12. "Informatics for economists". Textbook. Under the editorship. prof. V.M. Matyushka. M., INFRA-M, 2006.
13. Evdokimov V.V. Economic informatics, textbook for universities, St. Petersburg: Peter, 2011.

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

Course Policies

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

ECTS allocated based on Student Workload

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

Computer Science bachelor program, Department of "Political science"

Course Unit Title	Political Science
Course Unit Code	ÜFS-B05
Type of Course Unit	Elective
Level of Course Unit	
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Rahimov Elkhan Rahim
Name of Lecturer(s)	Rahimov Elkhan Rahim
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

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

Course Objectives:

The teaching of this subject has the following objectives:

- The main goal of the course is to help students develop a general understanding of modern political knowledge;
- The main teaching tools are lectures, SEMINARS, 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 assigned texts and all other assigned reading materials.

Learning Outcomes

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

1	A successful student will have fully mastered the key political concepts by the end of the course.	1, 2
2	The ability to analyze empirical and normative approaches will be developed.	1, 2
3	Familiarity with various political teachings will help them develop a broad and systematic political worldview.	1, 2
4	Formation of ideas about the goals and objectives of political science, scientific research methods, and its relationship with other sciences explains to students the relationship of this subject with other sciences.	1, 2
5	Distinguishes the dynamics of the emergence and development of political science, determines and applies the form appropriate to the topic	1, 2
6	Explains the goals and objectives of political science education	1, 2
7	Forms the ability to freely think about the theories taught in political science and to make predictions about events taking place in the international world	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	3
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	2
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	2
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		Lecture 1. Knowledge about politics. Stages of development of political science	
2		SEMINAR 1. Knowledge about politics. Development of political science stages	
3		Lecture 2. The Concept of the State	
4		SEMINAR 2. The Concept of the State	
5		Lecture 3. Political ideologies. Political power	
6		SEMINAR 3. Political ideologies. Political power	
7		Lecture 4. Democracy	
8		SEMINAR 4. Democracy	
9		Lecture 5. Foreign policy	
10		SEMINAR 5. Foreign policy	
11		Lecture 6. International relations	
12		SEMINAR 6. International relations	
13		Lecture 7. Global governance	
14		SEMINAR 7. Global governance	
15		Lecture 8. Game Theory. Political Conflict and Security SEMINAR 8. Game Theory. Political Conflict and Security	

Recommended Sources

TEXTBOOK(S)

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

Assessment

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

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

Course Policies

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

ECTS allocated based on Student Workload	
Total Workload	**90**
Total Workload/30(h)	**90/30**
ECTS Credits of the Course	**3**

Computer Science bachelor program, Department of "Marketing and Management"

Course Unit Title	Fundamentals of entrepreneurship and introduction to business
Course Unit Code	ÜFS-B04
Type of Course Unit	Elective
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	1

Course Coordinator	Alberto Levy
Name of Lecturer(s)	Alberto Levy
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	English, Azerbaijani
Prerequisites	-
Recommended Optional Program Components	-

Course description:

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 amid the contextual reality of today's extreme uncertainty. These skills will also be particularly relevant for future employment and businesses, as organizations 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.

Course Objectives:

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: Analyze the key components of the entrepreneurial process, namely; opportunity discovery, business modeling, 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.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Course structure, purpose and expectations	1, 2
2	Understanding of the role of entrepreneurship in driving innovation and economic development.	1, 2
3	Exploring examples of successful entrepreneurs and their impact on society	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	4
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	3
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4

4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	3
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	3
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1. Introduction To Entrepreneurship	
2		LECTURE 2. Entrepreneurial & Start Up Culture	
3		LECTURE 3. Startup Thinking	
4		LECTURE 4. Problem Definition	
5		LECTURE 5. Empathy and Observation	
6		LECTURE 6. Innovation and Creativity	
7		LECTURE 7. Ideation	
8		LECTURE 8. Group Project 1: Startup Concept	
9		LECTURE 9. Product Prototyping & Testing	
10		LECTURE 10. Understanding Business Models	
11		LECTURE 11. Go-To-Market and Marketing Strategies	
12		LECTURE 12. Financing Entrepreneurial Ventures	
13		LECTURE 13. Pitching to Investors	
14		LECTURE 14. How To Turn Your Idea into a Real Business	
15		LECTURE 15. Group Project 2 - Final Pitch Deck	

Recommended Sources

TEXTBOOK(S)

1. Hisrich, R.D., Peters, M.P., & Shepherd, D.A. Entrepreneurship (12th Edition). McGraw-Hill Education.
2. Scarborough, N.M. Essentials of Entrepreneurship and Small Business Management (9th Edition). Pearson.
3. Barringer, B.R. & Ireland, R.D. Entrepreneurship: Successfully Launching New Ventures (6th Edition). Pearson.
4. Boone, L. & Kurtz, D. Contemporary Business (18th Edition). Wiley.
5. Zimmerer, T.W. & Scarborough, N.M. Effective Small Business Management: An Entrepreneurial Approach. Pearson.

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

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

Computer Science bachelor program, Department ofMechanics and Mathematics"

Course Unit Title	Calculus - 1
Course Unit Code	İF-BO1
Type of Course Unit	Compulsory
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Bashirov Shaban Hashim
Name of Lecturer(s)	Bashirov Shaban Hashim
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

As a result of studying the subject "Mathematical Analysis", the student should know and be able to do the following:

- to know the basic methods of mathematical analysis and be able to apply them in practice;
- Must be able to understand and apply computers in practice to implement technologies for solving various problems of mathematical analysis;
- have the skills to solve practical mathematical problems;

It is intended to teach students the basic concepts of the subject, to master the 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.

Course Objectives:

The goal and main objective of teaching the subject is to provide future specialists with relevant knowledge about the subject of "Mathematical Analysis" and to create in them the ability to effectively use this knowledge in their work. The knowledge acquired will be significantly needed by specialists in applying and improving high technologies.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Be able to explain the basic concepts and methods used in mathematical analysis (limits, continuity, derivative, integrals, etc.). To analyze limits and infinitely small/large functions.	1, 2
2	To apply the concepts of the derivative and integral of a function in practical problems. Conduct analytical analysis of sets, functions, and sequences.	1, 2
3	The ability to construct and prove mathematical arguments. Analyze and solve difficult analytical problems step by step.	1, 2
4	Building and analyzing mathematical models in real-life and applied problems. To apply the concepts of derivative and integral in the fields of physics, engineering, and economics.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	4
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	3
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	3
6	ability to apply design and development principles to creating software systems of varying complexity	4
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	3
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	3
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam

1		LECTURE 1. Numerical sequence and its limit. Basic properties of the limit of a numerical sequence	
2		LECTURE 2. Function and methods of its definition. Basic properties of functions. Limit of a function at a point and at infinity	
3		LECTURE 3. Basic properties of the limit of a function. The existence theorem of the limit. Methods of calculating the limit of a function. Notable limits	
4		LECTURE 4. Infinitesimal and infinitesimal functions. Equivalent infinitesimal functions and their main properties	
5		LECTURE 5. Continuity of a function. Equivalent definitions of continuity of a function. Basic properties of a continuous function on a segment. Intersection points and types of intersection points	
6		LECTURE 6. Derivative of a function. Geometric and mechanical meanings of the derivative of a function. Derivatives of basic elementary functions, methods for finding the derivative	
7		LECTURE 7. Derivative of a parametric and implicitly given function. Derivatives of inverse and complex functions. Higher order derivative	
8		LECTURE 8. Differential of a function, differentiation methods. Basic theorems of differential calculus: Rolle, Cauchy and Lagrange theorems	
9		LECTURE 9. Applications of differential calculus: L'Hôpital's rule, Taylor and Maclaurin formulas. Increasing and decreasing functions	
10		LECTURE 10. Examining a function by extremum	
11		LECTURE 11. Indefinite integrals. Basic properties of the indefinite integral. Basic integration methods. Table of indefinite integrals of elementary functions	
12		LECTURE 12. Definite integral. Basic concepts. Basic properties of the definite integral	
13		LECTURE 13. Basic methods of calculating the definite integral. Theorem about the average value	
14		LECTURE 14. Application of the definite integral to solving a number of geometric problems	
15		LECTURE 15. Methods for approximating a definite integral	

Recommended Sources

TEXTBOOK(S)

1. Высшая математика для экономистов/ Pod ed. N. Sh. Kremera. 3rd edition. Moscow: Unity, 2010.
2. Higher mathematics for economists. Практикум/ Под ред. N.Sh. Kremer. Moscow: Unity, 2010.
3. Lectures by Akbarov MCC. Baku State University Publishing House. Baku-2001.
4. Almammedov MS et al. Problems and examples for the Higher Mathematics Course for Economists. Baku-2009.
5. Kudryavtsev V.A., Demidovich B.P. Short course of higher mathematics. - Moscow.: Nauka, 1985.
6. N.G.Ahmedov. Linear algebra and mathematical analysis, 2015

7. Klimenko Yu.I. Higher mathematics for economists: theory, examples, tasks. Moscow: "Examination", 2005.
8. Kudryavtsev V.A., Demidovich B.P.. Short course of advanced mathematics.-Moscow.: Nauka, 1985.
9. 3. Mordkovich A.G., Solodovnikov A.S. Mathematical analysis. -Moscow.: Higher School, 1990.
10. Golovina L.I. Linear algebra and some of its applications. -Moscow.: Nauka, 1985.
11. Collection of problems in mathematics. ch.1, Linear algebra and the basis of mathematical analysis / Pod ed. Yefimova A.V., Demidovicha B.P. Moscow.: Nauka, 1986.
12. Musayev NC and Gulmammadov VY Lectures and exercises on the Higher Mathematics course. Baku-1998.
13. Alessio Mangoni "Mathematical Analysis 1" theory and solved exercises, Publisher: Alessio Mangoni 2020, 202 pages
14. Ivan Stanimirovic "Mathematical Analysis and Analytical Modeling" Publisher: Arcler
15. Simone Malacrida "Introduction to Mathematical Analysis" Publisher: Simone Malacrida 2022, 82 pages

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

Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Calculus - 2
Course Unit Code	İF-BO2
Type of Course Unit	Compulsory
Level of Course Unit	1
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Bashirov Shaban Hashim
Name of Lecturer(s)	Bashirov Shaban Hashim
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

As a result of studying the subject "Mathematical Analysis", the student should know and be able to do the following:

- to know the basic methods of mathematical analysis and be able to apply them in practice;
- Must be able to understand and apply computers in practice to implement technologies for solving various problems of mathematical analysis;
- have the skills to solve practical mathematical problems;

It is intended to teach students the basic concepts of the subject, to master the 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

Course Objectives:
The goal and main objective of teaching the subject is to provide future specialists with relevant knowledge about the subject of "Mathematical Analysis" and to create in them the ability to effectively use this knowledge in their work. The knowledge acquired will be significantly needed by specialists in applying and improving high technologies.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Be able to explain the basic concepts and methods used in mathematical analysis (limits, continuity, derivatives, integrals, etc.). Analyze limits and infinitely small/large functions. Apply the concepts of the derivative and integral of a function to practical problems.	1, 2
2	Perform analytical analysis of sets, functions, and sequences. Ability to construct and prove mathematical arguments. Analyze and solve difficult analytical problems step by step.	1, 2
3	Analyze and solve difficult analytical problems step by step. Build and analyze mathematical models in real-life and applied problems. Apply the concepts of derivative and integral in the fields of physics, engineering, and economics.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	4
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	3
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	3
6	ability to apply design and development principles to creating software systems of varying complexity	4
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	3
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	3
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents			
Week	Chapter	Topics	Exam
1		LECTURE 1. Numerical sequence and its limit. Basic properties of the limit of a numerical sequence	
2		LECTURE 2. Function and methods of its definition. Basic properties of functions. Limit of a function at a point and at infinity	
3		LECTURE 3. Basic properties of the limit of a function. The existence theorem of the limit. Methods of calculating the limit of a function. Notable limits	
4		LECTURE 4. Infinitesimal and infinitesimal functions. Equivalent infinitesimal functions and their main properties	
5		LECTURE 5. Continuity of a function. Equivalent definitions of continuity of a function. Basic properties of a continuous function on a segment. Intersection points and types of intersection points	
6		LECTURE 6. Derivative of a function. Geometric and mechanical meanings of the derivative of a function. Derivatives of basic elementary functions, methods for finding the derivative	
7		LECTURE 7. Derivative of a parametric and implicitly given function. Derivatives of inverse and complex functions. Higher order derivative	
8		LECTURE 8. Differential of a function, differentiation methods. Basic theorems of differential calculus: Rolle, Cauchy and Lagrange theorems	
9		LECTURE 9. Applications of differential calculus: L'Hôpital's rule, Taylor and Maclaurin formulas. Increasing and decreasing functions	
10		LECTURE 10. Examining a function by extremum	
11		LECTURE 11. Indefinite integrals. Basic properties of the indefinite integral. Basic integration methods. Table of indefinite integrals of elementary functions	
12		LECTURE 12. Definite integral. Basic concepts. Basic properties of the definite integral	
13		LECTURE 13. Basic methods of calculating the definite integral. Theorem about the average value	
14		LECTURE 14. Application of the definite integral to solving a number of geometric problems	
15		LECTURE 15. Methods for approximating a definite integral	

Recommended Sources

TEXTBOOK(S)

1. T. B. Rodina, E.S. Trifanova, COURSE OF LECTURES ON MATHEMATICAL ANALYSIS – I Saint-Petersburg 2010
2. N.A. Neymatov LINEAR ALGEBRA AND MATHEMATICAL ANALYSIS, GANJA - 2019
3. K.A. Guryanova, U.A. Alekseeva, V.V. Boyashinova Mathematical analysis. Yekaterinburg, 2014
4. M.A. Korytova, S.A. Shunailova MATHEMATICAL ANALYSIS, Chelyabinsk 2018
5. S. Abdullayev, F. Abdullayev, V. Mehrabov – Lectures on Mathematical Analysis, Baku 2011

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

Course Policies

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

ECTS allocated based on Student Workload

Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Course Unit Title	Physics
Course Unit Code	İF-BO3
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hours/week)	2
Practice (hours/week)	0.67
Laboratory (hours/week)	0.33
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Salimov Ilham Nasir
Name of Lecturer(s)	Salimov Ilham Nasir
Name of Assistant(s)	-
Mode of Delivery	Face to Face
Language of Instruction	Azerbaijani, 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

Course Objectives:
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

At the end of the course the student will be able to		Assessment
1	The main form of delivery of course material is lectures. An important aspect of physics lectures is that real and computer-based physical experiments should be conducted, educational films, and model computer programs should be used. Important sections of the course program can be taken up in SEMINAR classes. As a rule, theoretical materials requiring complex mathematical apparatus and various methods of solving problems are considered in SEMINARS. Students can receive various types of homework to consolidate the materials received in semınars. They will practically understand the subject by performing laboratory work	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to the Program		
		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	4
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	4
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	3
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3
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.**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 **SEMINAR 1**	
2		**Topic No. 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 **SEMINAR 2**	

3		**Topic No. 3.**Elastic forces. Hooke's law. Mechanical stress. Friction force, types, friction coefficient. Gravitational force. Law of universal gravitation. Gravitational constant Mechanical work. Power, units of measurement. Impulse. Energy. Kinetic and potential energy. Law of conservation of mechanical energy. Law of conservation of momentum	
4		**Topic No. 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. Real gases. Force of interaction of molecules, Van der Waals equation **SEMINAR 3**	
5		**Topic No. 5**. Dance movement. Mathematical and spring dancers. Period of dance. Harmonic dances. Equations of harmonic dance. Mechanical waves and their types. Wavelength. Interference of waves	
6		**Topic No. 6.**Electrostatics. Electric charge, their mutual force. Coulomb's law. Electric field intensity. Intensity vector flux. Relationship between electric field intensity and potential. Potential difference	
7		**Topic No. 7.**Dielectrics. Dielectrics in an electric field. Polarization of dielectrics. Magnetoelectrics, piezoelectric effect. Electric capacity, units. Capacitors. Energy of a capacitor, series and parallel connection **SEMINAR 4**	
8		**Topic No. 8.**Constant 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, EHQ	
9		**Topic No. 9.**Structure and properties of solids. Theory of zones. Electric current in gases. Non-independent and independent discharges. Types of non-independent discharges.Thermionic emission phenomenon	
10		**Topic No. 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 **SEMINAR 5**	
11		**Topic No. 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		**Topic No. 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		**Topic No. 13.**Alternating current. Ohm's law for alternating current circuits. Transformers, principle of operation. Distribution and transmission of electrical energy over long distances	

14		**Topic No. 14.**Elements of geometric optics. Thin lens, Linzal's formula. Optical power of the lens Diopter. Linear magnification of the lens. Wave properties of light. Interference of light. Coherence **SEMINAR 6**	
15		**Topic No. 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	
		Topic No. 1. Introduction to laboratory work. Understanding errors. Determining the acceleration of gravity using a mathematical dancer.	
		Topic No. 2. Coulomb potential and Coulomb field of metal surfaces, determination of the charge of a sphere. Calculation of the interaction force between charged particles	
		Topic No. 3. Determination of capacitance in a capacitor, dielectric constant of the medium	

Recommended Sources

TEXTBOOK(S)

1. Gojayev Niftali Mehrali oglu. General physics course. Volume IV (optics). [textbook for higher education institutions]. Baku 2011.540 p.
2. R.M. Rzayev.Fnzika, [textbook for higher schools]. Baku 2015.736 p.
3. Aliyev Bayram Zeynal oglu. General physics course. Baku, Elm, 2010, 294p.
4. Ahmadov Faig Abdulavvel oglu. General Physics Course Textbook for Higher Education Institutions. Baku, 2006, 348 p.
5. B.D. Aliyev, Q.T. Hasanov. General physics course. Textbook for higher education institutions. Baku, 2004, 660 p.
6. Gojayev E.M., Safarov N.Y. “Applied Physics” Baku “AzTU “2018, 393 p..
7. Q.T. Hasanov, A.A. Aliyev. General physics course. . [textbook for higher education institutions]. Baku 2015. 440 p.
8. M. Murguzov, A. Alekperov, O. Hasanov. General physics course. [textbook for higher education institutions]. Baku 2011-322 p.
9. Eyvazov E.A, Farajov V.C., Gurbanov S.S. “Introduction to the Physics of Semiconductors” Baku “Chinar Çap” 2007, 392 p.
10. Eyvazov E.A. “Physics of Solids” Baku “Education” 2003, 455p
11. Hasanov I.S. “Plasma and batch technology” Baku “Science” 2007, 171p.
12. A.S. Abdinov, I.S. Hasanov, T.H. Huseynov “Fundamentals of electronic devices and emission electronics” Baku 2011, 358 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	
Total Workload	**90**
Total Workload/30(h)	**90/30**
ECTS Credits of the Course	**3**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Programming Basics-1
Course Unit Code	ÜF-BO4
Type of Course Unit	Compulsory
Level of Course Unit	1
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Elvin Gurbanov Shahin
Name of Lecturer(s)	Elvin Gurbanov Shahin
Name of Assistant(s)	-
Mode of Delivery	Face to face

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

Course description:

The aim of the course "Fundamentals of Programming" is to teach students the fundamental concepts and methods of programming, to master the syntax and structure of various programming languages. Through this course, students will develop logical thinking, analytical problem-solving and coding skills, as well as learn to effectively use programming tools and version control systems.

Course Objectives:

This course introduces the fundamental elements of programming, including variables, operators, conditional statements, loops, functions, and modular programming, through theoretical and practical approaches. The course also covers programming paradigms, object creation, algorithm construction, and representation techniques (pseudocode, flowcharts). Through practical exercises and independent work, students will apply the knowledge they have gained to solving real-world problems.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Master the basic concepts and syntax of programming. Writing and executing simple programs in Python and other programming languages.	1, 2
2	Build logical program structures using variables, operators, conditional statements, and loops effectively. Apply the principles of functions, modular programming, and object-oriented approaches.	1, 2
3	Finding solutions to real-world problems by describing and implementing algorithms. Participating in collective projects and ensuring code documentation through version control systems (Git).	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5

8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1. The Essence of Programming	
2		LECTURE 2. Version Control Systems	
3		LECTURE 3. Algorithms. Properties, types, and description methods of algorithms	
4		LECTURE 4. Algorithms. Descriptive methods	
5		LECTURE 5. Basic Variables, Types, and Operators	
6		LECTURE 6. Conditional Operators. Conditional operations: if-else, complex conditions, switch operators	
7		LECTURE 7. Loops. Loop structures: for, while, and do-while loops	
8		LECTURE 8. Functions and Modular Programming	
9		LECTURE 9. Programming Paradigms	
10		LECTURE 10. Lists, Arrays, and Data Structures	
11		LECTURE 11. Objects. The basics of objects in JS: definitions, properties and methods	
12		LECTURE 12. File Operations	
13		LECTURE 13. Error Management	
14		LECTURE 14. Recursion	
15		LECTURE 15. Software Testing and Documentation	

Recommended Sources

TEXTBOOK(S)

1. **Mark Lutz**– Learning Python, O'Reilly Media
2. **Zed A. Shaw**– Learn Python the Hard Way
3. **Real Python**–https://realpython.com
4. **Paul Barry**– Head First Python
5. **Eric Matthes**– Python Crash 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	
Total Workload	**150**
Total Workload/30(h)	**150/30**
ECTS Credits of the Course	**5**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Programming Basics -2
Course Unit Code	İF-BO5
Type of Course Unit	Compulsory
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	5

Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Mustafayev Gorxmaz Nureddin
Name of Lecturer(s)	Mustafayev Gorxmaz Nureddin
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Dear Students!

Welcome! I'm excited to have you in this class and look forward to the opportunity to learn, grow, and explore new ideas together. As we dive into the material, I encourage you to engage actively, ask questions, and make the most of our time together

This course is designed to challenge you, but also to foster an environment where you can expand your knowledge and develop skills that will be valuable both in your academic C++ journey and beyond. Please feel free to reach out to me if you have any questions or need clarification throughout the semester. I'm here to support you!

Let's make this a great semester!

Best regards,

Course Objectives:

Fundamentals of programming is an essential skill for any programmer looking to solve problems efficiently

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Understanding and utilizing programming is especially important when optimization is crucial, like in game development, live video apps, and other areas where even a one-second delay can impact performance. Big companies tend to focus on programming in coding interviews, so if you're good at it, you're more likely to land those higher-paying jobs.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program		
		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents			
Week	Chapter	Topics	Exam
1		LECTURE 1. Getting Started with C++	
2		LECTURE 2. Your First C++ Program	
3		LECTURE 3. C++ Comments	
4		LECTURE 4. C++ Variables, Constants and Literals	
5		LECTURE 5. C++ Data Types	
6		LECTURE 6. C++ Input Output (I/O)	
7		LECTURE 7. C++ Programming Operators	
8		LECTURE 8. C++ if...else Statement	
9		LECTURE 9. C++ for Loop	
10		LECTURE 10. C++ while and do...while Loop	

11		LECTURE 11. C++ break and continue	
12		LECTURE 12. C++ switch Statement	
13		LECTURE 13. C++ go to Statement	
14		LECTURE 14. C++ if...else Statement	
15		LECTURE 15. C++ for Loop	

Recommended Sources

TEXTBOOK(S)

1. Bjarne Stroustrup – "Programming: Principles and Practice Using C++"
2. Stephen Prata - "C++ Primer Plus"
3. Stanley B. Lippman, Josée Lajoie, Barbara E. Moo - "C++ Primer (5th Edition)"
4. Herbert Schildt – "C++: The Complete Reference"
5. Nicolai M. Josuttis - "The C++ Standard Library"

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

Total Workload	**150**
Total Workload/30(h)	**150/30**

ECTS Credits of the Course	**5**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Programming Basics-3
Course Unit Code	İF-BO6
Type of Course Unit	Compulsory
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Elvin Gurbanov Shahin
Name of Lecturer(s)	Elvin Gurbanov Shahin
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The aim of the "Fundamentals of Programming" course is to teach students the fundamental concepts and methods of programming, and to master the syntax and structure of various programming languages. Through this course, students will develop logical thinking, analytical problem-solving, and coding skills, as well as learn to effectively use programming tools and version control systems.

Course Objectives:

This course introduces the fundamental elements of programming, including variables, operators, conditional statements, loops, functions, and modular programming, through theoretical and practical approaches. The course also covers programming paradigms, object creation, algorithm construction, and

representation techniques (pseudocode, flowcharts). Through practical exercises and independent work, students will apply the knowledge they have gained to solving real-world problems.		
Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	Master the basic concepts and syntax of programming. Writing and executing simple programs in Python and other programming languages.	1, 2
2	Build logical program structures using variables, operators, conditional statements, and loops effectively. Apply the principles of functions, modular programming, and object-oriented approaches.	1, 2
3	Finding solutions to real-world problems by describing and implementing algorithms. Participating in collective projects and ensuring code documentation through version control systems (Git).	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to the Program		

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam

1		LECTURE 1. The Essence of Programming	
2		LECTURE 2. Version Control Systems	
3		LECTURE 3. Algorithms. Properties, types, and description methods of algorithms	
4		LECTURE 4. Algorithms. descriptive methods	
5		LECTURE 5. Basic Variables, Types, and Operators	
6		LECTURE 6. Conditional Operators. Conditional operations: if-else, complex conditions, switch operators	
7		LECTURE 7. Periods	
8		LECTURE 8. Functions and Modular Programming	
9		LECTURE 9. Programming Paradigms	
10		LECTURE 10. Lists, Arrays, and Data Structures	
11		LECTURE 11. Objects. The basics of objects in JS: definitions, properties and methods	
12		LECTURE 12. File Operations	
13		LECTURE 13. Error Management	
14		LECTURE 14. Recursion	
15		LECTURE 15. Software Testing and Documentation	

Recommended Sources

TEXTBOOK(S)

1. **Kernighan, BW & Ritchie, DM – "The C Programming Language"**A classic source explaining the basic principles of programming and the structure of the C language.
2. Prata, S. – "C Primer Plus" introduces the basic concepts of the C language for beginners with practical examples.
3. **Harbison, SP & Steele, GL – "C: A Reference Manual"**A comprehensive reference book on C language syntax and libraries
4. Martin, RC – "Clean Code: A Handbook of Agile Software Craftsmanship"
5. It focuses on efficient and readable code writing techniques, principles of code structuring and optimization.
6. Gamma, E., Helm, R., Johnson, R., & Vlissides, J. – "Design Patterns: Elements of Reusable Object-Oriented Software
7. It introduces reusable design patterns and implementation paths in object-oriented programming.
8. Abelson, H., & Sussman, GJ – "Structure and Interpretation of Computer Programs"
9. It is a useful resource for in-depth analysis of programming concepts and learning new approaches.
10. Bloch, J. – "Effective Java"

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

Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Linear Algebra and Analytic Geometry
Course Unit Code	İF-BO7
Type of Course Unit	Compulsory
Level of Course Unit	1
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	

Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Habibov Sanan Amirsoltan
Name of Lecturer(s)	Habibov Sanan Amirsoltan
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The teaching of the subject "Linear Algebra and Analytic Geometry" is intended to teach students the basic concepts of the subject, master basic knowledge about the matrix calculus of mathematics, methods for solving systems of linear equations, and their application. These, in turn, play an important role in the teaching of other subjects. The course consists of theoretical and SEMINAR lessons. Here, the application of all theorems and properties is reflected in practical exercises.

Course Objectives:

Elements of " Linear Algebra and Analytic Geometry " are applied in computing, programming, and various fields of economics. Therefore, specialists in the given areas must master the basics of this subject.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Teaching higher mathematics together with other fundamental sciences allows for the development of students' intellectual potential and the formation of creative personalities who successfully function in the modern system of relations. **EXPERIENCE TO BE GAINED:** 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, determines 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. Interprets and explains the principles and teaching methods (technologies) of mathematics teaching. 5. Makes logical judgments, draws conclusions, and justifies them.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5

2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	4
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	3
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	3
6	ability to apply design and development principles to creating software systems of varying complexity	4
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	3
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	3
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1. The concept of a matrix. Operations on matrices. Determinants of two and three orders. Basic properties of the determinant. Minor and algebraic complements	
2		SEMINAR 1	
3		LECTURE 2. Inverse matrix. Elementary transformations on a matrix. Rank of a matrix. n-order determinants	
4		SEMINAR 2	
5		LECTURE 3. System of linear equations. Methods for solving a system of linear equations: Cramer's rules, matrix method	
6		SEMINAR 3	
7		LECTURE 4. Gaussian method. System of linear equations in n-unknowns, Kronecker-Capelli theorem	
8		SEMINAR 4	
9		LECTURE 5. The concept of a vector. Scalar, vectorial and mixed products of vectors	
10		SEMINAR 5	
11		LECTURE 6. Equations of a straight line on a plane	

12		SEMINAR 6	
13		LECTURE 7. Equations of a plane and a straight line in space	
14		SEMINAR 7	
15		LECTURE 8. Two-order curves and surfaces SEMINAR 8	

Recommended Sources

TEXTBOOK(S)

1. Howard Anton, Chris Rohres. Elementary linear algebra. 7-th edition, John Wiley& Sons, INC.
2. Demidovich V.P., Kudryavtsev V. A. Short course of advanced mathematics. M.: "Nauka", 2001.
3. Ilyin V. A., Kurkina A. B. Higher mathematics M.: 2005.
4. Ilyin V. A., Pozniak E. G. Linear algebra. M.: "Nauka", 1981.
5. Beklemishev D. B. Course of analytical geometry and linear algebra. M., "High School", 1998
6. Howard Anton, Chris Rohres. Elementary linear algebra. 7-th edition, John Wiley& Sons, INC.
7. Demidovich V.P., Kudryavtsev V. A. Short course of advanced mathematics. M.: "Nauka", 2001.
8. Ilyin V. A., Kurkina A. B. Higher mathematics M.: 2005.
9. Ilyin V. A., Pozniak E. G. Linear algebra. M.: "Nauka", 1981.

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

Total Workload	**120**
Total Workload/30(h)	**120/30**

ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Probability Theory and Mathematical Statistics
Course Unit Code	İF-BO8
Type of Course Unit	Compulsory
Level of Course Unit	2
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Amiraslanli Fatma Hikmet
Name of Lecturer(s)	Amiraslanli Fatma Hikmet
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, 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.

Course Objectives:
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		
At the end of the course the student will be able to		Assessment
1	Developing the intellectual potential of students and increasing their skills in using mathematical methods in their future activities	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		Random events and probabilities SEMINAR 1	
2		LECTURE 1. Basic properties of probability	
3		Discrete random variables SEMINAR 2	
4		LECTURE 2. Distribution law of discrete random variables, distribution functions	

5		Discontinuous random variables SEMINAR 3	
6		LECTURE 3. Numerical characteristics of random variables and their properties	
7		Law of large numbers SEMINAR 4	
8		LECTURE 4. Two-dimensional random variables	
9		Elements of mathematical statistics SEMINAR 5	
10		LECTURE 5. Regression equations	
11		Regression equations SEMINAR 6	
12		LECTURE 6. Functional interaction. Correlation coefficient and its calculation	
13		Functional interaction. Correlation coefficient and its calculation SEMINAR 7	
14		LECTURE 7. Regression analysis	
15		Regression analysis SEMINAR 8	

Recommended Sources

TEXTBOOK(S)

1. N.N. Bavrin "Theory of probability and mathematical statistics" Higher school, 2005
2. V.E. Gmurman. "Theory of probability and mathematical statistics" Higher school, 2003
3. V.E. Gmurman. "Guide to solving problems in probability theory of mathematical statistics" Higher school, 2004.
4. Robert W. Hogg, Joseph W. McKean, Allen T. Craig Introduction to Mathematical Statistics Eighth Edition. 2019, pp. 762.
5. Thomas J. Faulkenberry Psychological Statistics First published 2022by, New York, NY 10158. pp. 122.
6. William Mendenhall, Robert J. Beaver, Barbara M. Beaver Introduction to Probability and Statistics. 13th EDITION, 2009, pp. 777.
7. Dean Chalmers Series Editor: Julian Gilbey Cambridge International AS & A Level Mathematics: Probability & Statistics 1Coursebook. Cambridge University Press. First published 2018, pp. 266.
8. Emelyanov, G. B. Task on the theory of probability and mathematical statistics: textbook / Г. В. Emelyanov, V.P. Skitovich. — 3rd ed., ster. — Saint Petersburg: Lan2019. — 332 p.
9. Monsik, V. B. Probability and statistics: textbook / V.B. Monsik, A. A. Skrynnikov. — 4th edition. — Moscow: Laboratory of Knowledge, 2020. — 384 c.
10. Gladkov, L.L. Theory of probability and mathematical statistics: textbook/ L. L. Gladkov, G. A. Gladkova. — 2-еизд., ex. — Sankt-Peterburg: Lan, 2020. —196 c

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	
Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Computer Architecture
Course Unit Code	İF-B09
Type of Course Unit	Compulsory
Level of Course Unit	1
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	2

Course Coordinator	Mustafayeva Sabina Fazil
Name of Lecturer(s)	Mustafayeva Sabina Fazil
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
The “Computer Architecture” course covers the functional-structural aspects of a personal computer organization, information management device, information display device sections covers, is intended to teach students important concepts and provide basic knowledge. The course consists of theoretical and SEMINAR lessons. Here, all technical concepts are described, explained, and their sections on its application and modern use are reflected.

Course Objectives:
Modern technical tools in the "Computer Architecture" course learning and using it is widely practiced. Therefore, those who study in appropriate areas Future professionals must master the capabilities of technical tools

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Formation of ideas about the goals and objectives of the science of teaching methodology "Computer Architecture", scientific research methods, and its relationship with other sciences	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5

8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 History of the development of computers. The main components of a computer	
2		LECTURE 2 Von Neumann architecture. Computer, structural diagram of the HS	
3		LECTURE 3 RAM and cache memory. External storage devices	
4		LECTURE 4 Internal structure of the microprocessor. Addressing modes referring to the instruction counter register, stack organization	
5		LECTURE 5 Command system and operand addressing. Information exchange between the computer and external devices	
6		LECTURE 6 Internal memory devices. Computer system unit and microprocessors	
7		LECTURE 7 Controller and bus. Principles of operation of monitors	
8		LECTURE 8 BIOS and CMOS chip	
9		LECTURE 9 RAM internal memory device	
10		LECTURE 10 System unit	
11		LECTURE 11 TV-tuner. Projector. Their types	
12		LECTURE 12 Digital cameras. Their types and software	
13		LECTURE 13 Computer output devices. Liquid crystal, LED, plasma and other technology monitors	
14		LECTURE 14 External audio equipment	
15		LECTURE 15 Communication devices. Modem and types of modems	

Recommended Sources

TEXTBOOK(S)

1. Traskovsky A. BIOS. BHV-Petersburg, 2007. 155s.
2. Guk M.Yu. Hardware IBM PC: Encyclopedia. Peter, 2006. 1072 p.
3. Tanenbaum E. Architecture of the computer. Peter, 2006, 698 c.
4. Zhmakin A.P. Computer architecture + CD. Учебное пособие, BHV-Petersburg, 2006, 315.
5. Kuzin A.V., Peskova S.A. Architecture of computers and computing systems Textbook for
6. ССУЗов, Forum, 2006, 350 с.
7. Maksimov N.V., Partyka T.L., Popov I.I. Architecture of computers and computing systems. Учебник для ССУЗов, Forum, 2007, 511р.
8. Kutuzov M., Preobrazhensky A. Выбор и моднизирация компутер: Анатомия ПК., Peter, 2004, 320с.
9. Krymov B. Diagnostics PC from scratch! + CD. Лучшие книги, 2006, 268 с.
10. Solomenchuk V.G., Solomenchuk P.V. Железо ПК 2007. БХВ-Петербург, 2007 г., 496с.
11. Tyunin N.A. LCD monitors: application to the journal "Remont and Service".
12. Guk M.Yu. Storage device interfaces: ATA, SCSI and others: encyclopedia. Peter, 2007, 447p.
13. Vetrov S.I. Computer "metal". Solon, 2001, 559
14. Saveliev M.V. Konstruktorsko-technologicheskoe objekcije proizvodstvo EVM.
15. Teaching manual, Higher school, 2001, 319p

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

Total Workload	**150**
Total Workload/30(h)	**150/30**

ECTS Credits of the Course	**5**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Web Technology
Course Unit Code	İF-B11
Type of Course Unit	Compulsory
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Fataliyeva Aysel Zakir
Name of Lecturer(s)	Fataliyeva Aysel Zakir
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	English, Azerbaijani
Prerequisites	-
Recommended Optional Program Components	-
Course description: The main goal of teaching web programming is to teach students the knowledge and skills necessary to design, manage, and develop web applications and websites.	

Course Objectives:
This course provides students with the web programming skills required in the modern job market and with the ability to adapt to modern technologies. As a result of the course, students can create their own projects.

Front-end development:

- **HTML**: Structuring web pages
- **CSS**: Design and layout principles
- **JavaScript**: Providing dynamic functionality and user interaction

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Understand the architecture and functioning of the World Wide Web, including web servers, browsers, HTTP protocol, and client-server communication.	1, 2
2	Design and develop dynamic, interactive web pages and applications using core technologies such as HTML, CSS, JavaScript, and web frameworks.	1, 2
3	Implement and integrate server-side programming and database connectivity to build full-stack web applications that meet functional and user experience requirements.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5

10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1.HTML, Visual Studio Development Environment	
2		LECTURE 2. CSS Syntax: External, internal, inline CSS usage. CSS Properties: Background property, font-family, loading fonts (Google Fonts)	
3		LECTURE 3. CSS Selectors: Simple selectors (tag, id, class), combinators, pseudo-class selectors, pseudo-element selectors, attribute selectors. Document Box Model: Element dimensions, inline and block elements, spacing (margin, padding), borders, box-sizing property, max-width, min-width properties	
4		LECTURE 4. Text Alignment: Vertical and horizontal alignment, text-decoration, text-transformation, text-spacing, font-style, font-weight, font-variant properties, font size (px, em, vw). Icons (Google Fonts), Tables: Border, border-collapse properties, hoverable tables, striped tables, responsive tables	
5		LECTURE 5. Display Property: Comparison of display and visibility properties. CSS Features: Overflow, float properties, flexbox, forms.	
6		LECTURE 6. Bootstrap	
7		LECTURE 7. JavaScript Basics: Introduction, syntax, comments, variables, usage of let and const, operators, assignment. JavaScript Data Types: Functions, objects, events, string expressions, string manipulation methods	
8		LECTURE 8. Numbers: Working with numbers and their methods, arrays, array manipulation methods, sorting, and iteration (eg, forEach(), map(), filter(), 2reduce()). Date Object: Date Get methods, Date Set methods, Math, Random, Boolean, comparison operators	
9		LECTURE 9. Control Flow: if-else, switch, for loop, while loop, break, continue, iterating arrays	
10		LECTURE 10. Advanced Concepts: Sets, maps, typeof operator, type conversion, RegExp usage	
11		LECTURE 11. Error Handling: throw, try-catch-finally, strict mode, this keyword, arrow functions	
12		LECTURE 12. Classes: Constructor method, modules, JSON	
13		LECTURE 13. HTML DOM Manipulation: Finding, modifying, deleting, and adding HTML elements	

14		LECTURE 14. Form Validation: Data validation, CSS manipulation, events, event listeners, Node	
15		LECTURE 15. Project	

Recommended Sources

TEXTBOOK(S)

1. Jon Duckett – "HTML and CSS: Design and Build Websites"
2. Jon Duckett – "JavaScript and jQuery: Interactive Front-End Web Development"
3. David Sawyer McFarland – "JavaScript & jQuery: The Missing Manual"
4. Ethan Brown – "Web Development with Node and Express"
5. Eric Freeman – "Head First HTML5 Programming"

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

Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Analytic Geometry
Course Unit Code	İF-B10
Type of Course Unit	Compulsory
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Taghiyev Rauf Mursal
Name of Lecturer(s)	Taghiyev Rauf Mursal
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The course "Analytical Geometry" is a section of Higher Mathematics, studying the properties of figures according to the coordinates of their characteristic points. Here, rectangular and polar coordinate systems, coordinate transformations, rectangular coordinate systems in the plane and in space, straight lines and planes, and their mutual relationships are studied.

Course Objectives:

In modern times, the application of precise mathematical methods to various fields of science has become a necessity. The aim of the course is to provide students with mathematical knowledge that will help them solve the problems they will encounter.

Learning Outcomes

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

1	Explains the goals and objectives of analytical geometry, scientific research methods, and its relationship with other sciences.	1, 2
2	Interprets and explains the tools of teaching analytical geometry, identifies and selects visual aids for a specific lesson.	1, 2
3	Interprets and explains the principles and teaching methods (technologies) of teaching analytical geometry.	1, 2
4	Makes logical judgments, draws conclusions, and justifies them.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	4
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	3
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	3
6	ability to apply design and development principles to creating software systems of varying complexity	4
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	3
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	3
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Rectangular coordinate system in the plane. Basic concepts. Simple problems of analytical geometry	
2		SEMINAR 1	
3		LECTURE 2 Vector algebra. Basic concepts. Linear operations on vectors. Direction cosines	

4		SEMINAR 2	
5		LECTURE 3 Scalar, vectorial, and mixed products of vectors	
6		SEMINAR 3	
7		LECTURE 4 Equations of a straight line in the plane	
8		SEMINAR 4	
9		LECTURE 5 Two-order curves in the plane: circle, ellipse, parabola, and hyperbola	
10		SEMINAR 5	
11		LECTURE 6 Rectangular coordinate system in space. Plane equations. Mutual position of two planes	
12		SEMINAR 6	
13		LECTURE 7 Equations of a straight line in space. Interactions of two straight lines and of a straight line and a plane in space	
14		SEMINAR 7	
15		Two-dimensional surfaces SEMINAR 8	

Recommended Sources

TEXTBOOK(S)

1. Howard Anton, Chris Rohres. Elementary linear algebra. 7-th edition, John Wiley& Sons, INC.
2. Demidovich V.P., Kudryavtsev V. A. Short course of advanced mathematics. M.: "Nauka", 2001.
3. Ilyin V. A., Kurkina A. B. Higher mathematics M.: 2005.
4. Ilyin V. A., Pozniak E. G. Linear algebra. M.: "Nauka", 1981.
5. Beklemishev D. B. Course of analytical geometry and linear algebra. M., "High School", 1998.
6. Alexander Akhmerov, Alexander Tyurin "Fundamental Higher Mathematics Linear Algebra and Analytical Geometry PI" Publisher: LAP LAMBERT Academic Publishing 2019. 264 pages
7. Michael L. O'Leary “Linear Algebra” Publisher: Wiley 2021
8. Frederick P. Greenleaf, Sophie Marques “Linear Algebra I” Publisher: American Mathematical Society, Courant Institute of Mathematical Sciences at New York University 2019

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	
Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Discrete Mathematics
Course Unit Code	İF-B12
Type of Course Unit	Compulsory
Level of Course Unit	2
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	3
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Ibrahimova Sabina
Name of Lecturer(s)	Ibrahimova Sabina
Name of Assistant(s)	-
Mode of Delivery	Face to face

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

Course description:

As a result of studying the subject "Discrete Mathematics", the student should be able to do the following:

• to know the basic methods of discrete mathematics and be able to apply them in practice;

• must be able to understand and apply computers in practice to implement technologies for solving various problems in discrete mathematics;

• have the skills to solve practical mathematical problems;

It is intended to teach students the basic concepts of the subject, to master the 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.

Course Objectives:

The goal and main objective of teaching the subject is to provide future specialists with relevant knowledge about the subject of "Discrete Mathematics" and to create in them the ability to effectively use this knowledge in their work. The knowledge acquired will be significantly needed in applying high technologies and improving them in specialists who have these specialties.

Learning Outcomes

At the end of the course the student will be able to	Assessment
The knowledge acquired will be significantly needed in applying and improving high technologies among specialists with these qualifications.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4

9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 The concept of reasoning	
2		LECTURE 2 Negation actions on concepts of reasoning	
3		LECTURE 3 Basic concepts of set theory	
4		LECTURE 4 Operations on sets	
5		LECTURE 5 About Find functions	
6		LECTURE 6 Logical suggestions	
7		LECTURE 7 Tables of truth of actions	
8		LECTURE 8 Actions on logical propositions	
9		LECTURE 9 Operations on graphs	
10		LECTURE 10 Types of graphs	
11		LECTURE 11 The concept of radius in a graph	
12		LECTURE 12 The concept of diameter in a graph	
13		LECTURE 13 Information about the basic elements of combinatorics	
14		LECTURE 14 Examples according to the laws of permutation, arrangement, and combination	
15		LECTURE 15 Examples according to the laws of permutation, arrangement, and combination	

Recommended Sources

TEXTBOOK(S)

1. Farajov R.H., Shimiyev H.V. Discrete Mathematics, Baku University Publishing House, Baku, 1998, 216 p.
2. Kenneth H. Rosen. Discrete Mathematics and Its Applications, 7th edition, McGraw Hill, New York, 2007, 1071 p.
3. Aslanova N.X., Ahmadova J.B., Mammadov K.Sh., Mansimov KB Graph Theory, Baku, 2014, 180 p.
4. Mansimov K.B., Ahmadova J.B., Aliyeva S.T. Discrete analysis, Baku University Publishing House, Baku, 2018, 302 p.
5. Yablonsky S.V. Introduction to Discrete Mathematics, Mir Publishers, Moscow, 1989, 384p
6. Feyziyev F.G. Some chapters of discrete mathematics, “Education” NPM, Baku, 2008, 242 p.
7. Aliyev A.Y., Piriverdiyev V.A. Elements of discrete mathematics, Baku, Mutarcim, 2003, 92

8. Akbarov M.C. Lectures on Algebra, Baku, Nurlar, 2001, 473 p.
9. Sadigov N.A. Scientific foundations of the elementary course of mathematics, Baku, Maarif, 1991, 352 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

Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Differential Equations
Course Unit Code	İF-B13
Type of Course Unit	Compulsory

Level of Course Unit	3
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Fatma Hikmet Amiraslan
Name of Lecturer(s)	Fatma Hikmet Amiraslan
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
The subject "Differential Equations", intended for students studying in the bachelor's degree program in the fields of K and IT, includes basic concepts about differential equations, problems that can be reduced to differential equations, ways to solve equations such as separable, linear, linear homogeneous equations of variables, Bernoulli's equation, second-order homogeneous and linear differential equations, systems of differential equations, as well as general information about differential equations with special derivatives.

Course Objectives:
To instill in students the ability to construct mathematical models of technological processes in order to analyze them according to their rates of change.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Formation of ideas about the goals and objectives of the theory of differential equations as a science, scientific research methods, and its relationship with other sciences;	1, 2
2	Increasing knowledge about the subject, principles, and application methods of the differential equations course;	1, 2
3	Providing knowledge about the goals and objectives of the Differential Equations course to undergraduate students	1, 2
4	Performing practical tasks in the process of teaching the Differential Equations course to undergraduate students;	1, 2
5	Monitoring and investigating the implementation of practical tasks	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program		
		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3
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 differential equations. Some problems related to differential equations. General, particular and specific solutions of ordinary differential equations. Cauchy problem	
2		Separable and separable differential equations with respect to their variables. Homogeneous linear equations	
3		Separable and separable differential equations with respect to their variables. Homogeneous linear equations	
4		First-order linear differential equations. Bernoulli equation	
5		First-order linear differential equations. Bernoulli equation	
6		Complete differential equations. Integrating multiplication	
7		Complete differential equations. Integrating multiplication	
8		General concepts about higher-order differential equations. Reducible second-order differential equations	

9		General concepts about higher-order differential equations. Reducible second-order differential equations	
10		Second-order linear differential equations. Second-order linear homogeneous differential equations. Second-order linear homogeneous differential equations with constant coefficients	
11		Second-order linear differential equations. Second-order linear homogeneous differential equations. Second-order linear homogeneous differential equations with constant coefficients	
12		System of ordinary differential equations. Basic concepts. Integration of ordinary systems. System of ordinary differential equations with constant coefficients	
13		System of ordinary differential equations. Basic concepts. Integration of ordinary systems. System of ordinary differential equations with constant coefficients	
14		General information about special differential equations. Types of second-order special differential equations	
15		General information about special differential equations. Types of second-order special differential equations	

Recommended Sources

TEXTBOOK(S)

1. Shepley L. Roos. Introduction to ordinary differential equations, 4th edition, JOHN WILEY & SONS, 1989.
2. D.T. Written. Abstracts of lectures on higher mathematics. Moscow, Higher Education, 2009.
3. S.N. Kiyasov. Differential equations. Basic theory. Methods of problem solving. Kazan, 2011.
4. KKPonomarev. Special course of higher mathematics. Moscow, "High School", 2014.
5. V.P. Minorsky. Collection of tasks on higher mathematics. Moscow, "Nauka", 2009.

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

Course Policies
• Attendance of the course is mandatory. • Late assignments will not be accepted unless an agreement is reached with the lecturer. • Students cannot use calculators during the exam. • Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Numerical Methods – 1
Course Unit Code	İF-B14
Type of Course Unit	Compulsory
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Sona Farajova Samir
Name of Lecturer(s)	Sona Farajova Samir
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-

Recommended Optional Program Components	-

Course description:

The subject "Numerical Methods" studies numerical methods for solving mathematical problems. It provides effective approaches for differential equations, integrals, nonlinear equations, and other mathematical problems that cannot be solved analytically. This subject is closely related to applied mathematics and computer science.

Course Objectives:

The aim of this subject is to teach students numerical approaches, improve their skills in performing mathematical calculations with computers, and explain the principles of solving real-world problems numerically. Also, the main objectives of the subject are to teach students how to conduct error analysis and develop algorithmic thinking.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	They will understand the basic principles of numerical methods	1, 2
2	They will have the ability to conduct error analysis.	1, 2
3	Will be able to apply numerical solution methods for nonlinear equations	1, 2
4	They will be able to perform numerical solutions of differential and integral equations.	1, 2
5	They will understand numerical interpolation and approximation methods.	1, 2
6	They will gain the ability to apply algorithms in programming languages.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4

10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Application of differential to approximate calculations	
2		LECTURE 2 The complete differential of a multivariable function and approximate calculations using it	
3		LECTURE 3 Approximate solution of univariate nonlinear equations. Methods of isolating roots. Dichotomy (dividing a piece in half) method. Simple iteration method and its error	
4		LECTURE 4 Approximate solution of univariate nonlinear equations. Methods of isolating roots. Dichotomy (dividing a piece in half) method. Simple iteration method and its error	
5		LECTURE 5 Tangent (Newton) method. Chord method. Parabola method. Mixed method	
6		LECTURE 6 Tangent (Newton) method. Chord method. Parabola method. Mixed method	
7		LECTURE 7 Function approximation. Interpolation. Lagrange's interpolation polynomial. Lagrange's interpolation polynomial for equal steps	
8		LECTURE 8 Function approximation. Interpolation. Lagrange's interpolation polynomial. Lagrange's interpolation polynomial for equal steps	
9		LECTURE 9 Divided differences and their properties. Newton's interpolation polynomial for unequal steps	
10		LECTURE 10 Divided differences and their properties. Newton's interpolation polynomial for unequal steps	
11		LECTURE 11 Finite differences and their properties. Newton's second interpolation polynomial. Error of interpolation formulas	
12		LECTURE 12 Finite differences and their properties. Newton's second interpolation polynomial. Error of interpolation formulas	
13		LECTURE 13 Numerical differentiation. Problem statement. Approximation of derivatives by means of local interpolation. Error of numerical differentiation	
14		LECTURE 14 Numerical differentiation. Problem statement. Approximation of derivatives by means of local interpolation. Error of numerical differentiation	
15		LECTURE 15 Numerical integration	

Recommended Sources

TEXTBOOK(S)

1. A.S. Hasanov M.I. Seyidov “Special Sections of Higher Mathematics” Textbook, 2018
2. V.M. Abdullayev Numerical methods. 2019
3. A.V. Зенков "Численные методы" Yekaterinburg Издательство Уралского универстета 2016

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

Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Numerical Methods – 2
Course Unit Code	İF-B15

Type of Course Unit	Compulsory
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Farajova Sona Samir
Name of Lecturer(s)	Farajova Sona Samir
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject "Numerical Methods" studies numerical methods for solving mathematical problems. It provides effective approaches for differential equations, integrals, nonlinear equations, and other mathematical problems that cannot be solved analytically. This subject is closely related to applied mathematics and computer science.

Course Objectives:

The aim of this subject is to teach students numerical approaches, improve their skills in performing mathematical calculations with computers, and explain the principles of solving real-world problems numerically. Also, the main objectives of the subject are to teach students how to conduct error analysis and develop algorithmic thinking.

Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	They will understand the basic principles of numerical methods	1, 2
2	They will have the ability to conduct error analysis.	1, 2
3	Will be able to apply numerical solution methods for nonlinear equations	1, 2
4	They will be able to perform numerical solutions of differential and integral equations.	1, 2
5	They will understand numerical interpolation and approximation methods.	1, 2
6	They will gain the ability to apply algorithms in programming languages.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Approximate solution of univariate nonlinear equations	

2		LECTURE 2 Methods of isolating roots. Dichotomy (dividing a piece in half) method	
3		LECTURE 3 Simple iteration method and its error	
4		LECTURE 4 The method of tangents (Newton). The method of chords	
5		LECTURE 5 Parabola method. Mixed method	
6		LECTURE 6 Divisible differences and their properties	
7		LECTURE 7 Newton's interpolation polynomial for unequal steps	
8		LECTURE 8 Numerical integration methods	
9		LECTURE 9 Newton Cotes formulas	
10		LECTURE 10 Numerical integration methods	
11		LECTURE 11 Rectangles and trapezoids method	
12		LECTURE 12 Numerical integration methods	
13		LECTURE 13 Simpson's method	
14		LECTURE 14 Approximate solution methods for ordinary differential equations	
15		LECTURE 15 Approximate solution methods for ordinary differential equations	

Recommended Sources

TEXTBOOK(S)

1. A.S. Hasanov, M.I. Seyidov “Special Sections of Higher Mathematics” Textbook, 2018
2. V.M. Abdullayev Numerical methods. 2019
3. A.V. Зенков "Численные методы" Yekaterinburg Издательство Уралского универстета 2016

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

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Operating Systems
Course Unit Code	İF-B16
Type of Course Unit	Compulsory
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Mustafayeva Sabina Fazil
Name of Lecturer(s)	Mustafayeva Sabina Fazil
Name of Assistant(s)	-
Mode of Delivery	Face to face

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

Course description:

The role of operating systems in science, technology and other fields. Computer software, understanding of the Windows operating system, the architecture of the Windows system, its main parameters and working principle are explained. The desktop, working with windows, setting the main parameters, working with folders and files and working with other operating systems.

Course Objectives:

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		
At the end of the course the student will be able to		Assessment
1	Formation of ideas about the goals and objectives of operating systems as a science, scientific research methods, and its relationship with other sciences	1, 2
2	Formation of ideas about the forms of organizing operating systems training	1, 2
3	Formation of ideas about operating systems training tools	1, 2
4	Formation of ideas about the principles and training methods of operating systems training	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 General information about operating systems	
2		LECTURE 2 History of the development of operating systems	

3		LECTURE 3 Windows operating system and its versions	
4		LECTURE 4 File, directory organization	
5		LECTURE 5 Organizing folders	
6		LECTURE 6 FAT, VFAT, FAT32, file systems	
7		LECTURE 7 HPFS, NTFS file systems	
8		LECTURE 8 Types of operating system kernel architecture	
9		LECTURE 9 Important principles of building operating systems	
10		LECTURE 10 Classification of interfaces	
11		LECTURE 11 WIMP, SILR, POSIX interfaces	
12		LECTURE 12 Windows operating systems	
13		LECTURE 13 New technologies applied in the WINDOWS operating system	
14		LECTURE 14 Network operating systems	
15		LECTURE 15 Databases in network operating systems	

Recommended Sources

TEXTBOOK(S)

1. S.Q. Karimov, S.B. Habibullayev, T.I. Ibrahimzadeh “Informatics” Baku-2013;
2. A.M. Rustamov “Informatics” Baku-2013;
3. William Stollings Operating Systems 2004;
4. Tanenbaum E.S., Bos Kh. Modern operating systems. 4th edition. 2015;
5. Gordeev A.V. Operating systems 2nd edition. 2007;
6. Olifer V.G., Olifer N.A. Network operating systems. 2nd edition. 2009
7. Karpov V.E., Kon'kov K.A. Basic operating systems, Course lectures. 2011;
8. Partyka T.L, Popov I. И. Operating systems, environments and shells: 2010;
9. Chekmarev, A.N. Windows 7. Руководство администратора (В подлиннике) – 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	
Total Workload	**150**
Total Workload/30(h)	**150/30**
ECTS Credits of the Course	**5**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Programming Technologies
Course Unit Code	İF-B17
Type of Course Unit	Compulsory
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Elvin Gurbanov Shahin
Name of Lecturer(s)	Elvin Gurbanov Shahin
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English

Prerequisites	-
Recommended Optional Program Components	-

Course description:

The aim of the Programming Technologies course is to teach students the fundamental principles of programming and to familiarize them with modern programming languages. The course explains various programming tools and methods through practical examples. Students enhance their analytical thinking and creative skills by applying efficient approaches to solving real-world problems. This knowledge lays the groundwork for their success in various technological fields. Ultimately, the course is designed to cultivate programmers who can develop competitive and innovative solutions

Course Objectives:

Programming Technologies is designed to introduce students to the core concepts and practices of modern programming. The course covers various programming languages, development environments, and tools while emphasizing both theoretical foundations and practical applications. Students will engage in hands-on projects that involve designing, implementing, and optimizing software solutions for real-world problems. In addition, the course fosters analytical thinking, creative problem-solving, and collaboration, all of which are essential for a successful career in software development. Ethical conduct and academic integrity are also emphasized to prepare students for professional practice.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Master fundamental programming concepts and methodologies	1, 2
2	Develop proficiency in one or more modern programming languages through practical exercises.	1, 2
3	Design, implement, test, and optimize software solutions addressing real-world challenges.	1, 2
4	Analyze algorithms and data structures to improve program efficiency.	1, 2
5	Collaborate effectively in team projects and communicate technical ideas clearly.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5

7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 The Essence of Programming	
2		LECTURE 2 Version Control Systems	
3		LECTURE 3 Variables	
4		LECTURE 4 Conditional Operators	
5		LECTURE 5 Loops	
6		LECTURE 6 Arrays and Matrices	
7		LECTURE 7 Objects	
8		LECTURE 8 Functions and Procedures	
9		LECTURE 9 Programming Paradigms	
10		LECTURE 10 Software Development Life Cycles (SDLC)	
11		LECTURE 11 Web Development Basics	
12		LECTURE 12 Advanced Web Development	
13		LECTURE 13 Client-Side Frameworks and Libraries	
14		LECTURE 14 React Hooks	
15		LECTURE 15 State Management with React.js	

Recommended Sources

TEXTBOOK(S)

1. Kernighan, B.W., & Ritchie, D.M. – The C Programming Language (2nd Edition)
2. A foundational text introducing the principles of the C programming language and structured programming.
3. Aho, A.V., Lam, M.S., Sethi, R., & Ullman, J.D. – Compilers: Principles, Techniques, and Tools

4. An in-depth look at compiler design, language analysis, and algorithm construction.
5. Zelle, J. – Python Programming: An Introduction to Computer Science
6. An accessible introduction to programming concepts using Python as the medium.
7. Cormen, T.H., Leiserson, C.E., Rivest, R.L., & Stein, C.. – Introduction to Algorithms A comprehensive guide to algorithm design and analysis
8. Martin, R.C. – Clean Code: A Handbook of Agile Software Craftsmanship Guidelines for writing clear, maintainable, and efficient code.
9. Gamma, E., Helm, R., Johnson, R., & Vlissides, J. – Design Patterns: Elements of Reusable Object-Oriented Software
10. A detailed exploration of common design patterns used in object-oriented programming.
11. Abelson, H., & Sussman, G.J. – Structure and Interpretation of Computer Programs
12. An advanced text for understanding programming language paradigms and techniques.
13. Bloch, J. – Effective Java. Best practices and design principles for programming in Java.

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

Total Workload	**150**
Total Workload/30(h)	**150/30**

ECTS Credits of the Course	**5**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Database System
Course Unit Code	İF-B18
Type of Course Unit	Compulsory
Level of Course Unit	3
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Ali Ahmadli
Name of Lecturer(s)	Ali Ahmadli
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-
Course description: To teach students the concepts of databases, their structure, management, and how they are used in real-world applications. Students will be able to perform database operations and effectively manage database systems using the SQL language.	
Course Objectives: This course covers the basic concepts of databases, ER models, relational models, SQL queries, normal forms, indexing, security, backup and recovery strategies, as well as the design and implementation of database management systems. The course consists of both theoretical and practical parts.	

Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	Will be able to explain the basic concepts of databases;	1, 2
2	Will be able to build an ER (Entity-Relationship) model and convert it into a relational model;	1, 2
3	Will be able to write and modify data queries in SQL language;	1, 2
4	Will be able to prepare a database project and implement it in the system;	1, 2
5	Will be able to apply database security and data recovery strategies.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 What is a database system?	
2		LECTURE 2 Relational databases	

3		LECTURE 3 Database architecture	
4		LECTURE 4 Operations management	
5		LECTURE 5 Evolution of data models	
6		LECTURE 6 Database design and ER model: an overview	
7		LECTURE 7 ER model	
8		LECTURE 8 Code Rules	
9		LECTURE 9 Logical representation of data, keys, integrity rules	
10		LECTURE 10 Atomic domain and normalization (1NF, 2NF, 3NF, BCNF)	
11		LECTURE 11 What are the limitations?	
12		LECTURE 12 Views: access to views, data independence, security view updates, Table and view comparison	
13		LECTURE 13 Data definition. Aggregate function. Null values. Nested subqueries. Join relationships. Triggers	
14		LECTURE 14 Transaction management: ACID properties,	
15		LECTURE 15 Serialization and concurrency control	

Recommended Sources

TEXTBOOK(S)

1. lmasri, R., Navathe, S.B. – Fundamentals of Database Systems
2. Silberschatz, A., Korth, H.F., Sudarshan, S. – Database System Concepts
3. Date, C.J. – An Introduction to Database Systems
4. Rob, P., Coronel, C. – Database Systems: Design, Implementation, and Management
5. Connolly, T., Begg, C. – Database Systems: A Practical Approach to Design, Implementation, and Management

Assessment

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

Assessment Criteria Final grades are determined according to the Academic Regulations of WCU	
Course Policies • Attendance of the course is mandatory. • Late assignments will not be accepted unless an agreement is reached with the lecturer. • Students cannot use calculators during the exam. • Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Western Caspian University General Student Discipline Regulations	
ECTS allocated based on Student Workload	
Total Workload	**150**
Total Workload/30(h)	**150/30**
ECTS Credits of the Course	**5**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Computer Networks
Course Unit Code	İF-B19
Type of Course Unit	Compulsory
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	3
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Rzaguliyev Alikhan Ilgar
Name of Lecturer(s)	Rzaguliyev Alikhan Ilgar

Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, 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.

Course Objectives:
Systems analysis, the role of the discipline in science, technology and other fields, types of analysis, risk management, communication, programs used for systems analysis, and the main parameters and working principles of software are explained.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Formation of ideas about the goals and objectives of systems analysis as a science, scientific research methods, and its relationship with other sciences;	1, 2
2	Formation of ideas about the forms of systems analysis	1, 2
3	Formation of ideas about the tools of systems analysis training	1, 2
4	Formation of ideas about the principles and training methods of systems analysis training	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4

9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction to computer networks. History and basic terminology of computer networks. Network topologies What are computer networks? Network devices. Routers. Modems. Firewalls	
2		LECTURE 2 History and basic terminology of computer networks. Network topologies	
3		LECTURE 3 Network devices. Routers. Modems. Firewalls. Innovations in computer networks and how to protect them Internet of Things (IoT). Internet and web.	
4		LECTURE 4 Computer network types by scale	
5		LECTURE 5 Role of computer networks in commerce CAS, ACAS and other systems. Their role in the network	
6		LECTURE 6 The role of computer networks in air transport	
7		LECTURE 7 Satellite networks and related systems. ADS-B. ILS. MLS and other computer systems OSI Model. TCP/IP Model	
8		LECTURE 8 Client-Server Architecture. Peer-to-Peer (P2P) Architecture. Data Transmission	
9		LECTURE 9 Network Protocols. Communication Protocols IP Addressing and Subnetting. Ethernet and LAN Technologies. MAC address	
10		LECTURE 10 Wireless Networking	
11		LECTURE 11 Wireless network standards Network Security. Cyber security. Cryptography	
12		LECTURE 12 Telecommunications networks. Network Neutrality. Virtualization in Networking	
13		LECTURE 13 Cloud. Cloud Networking. Quality of Service (QoS). Proxy Servers Mobile Networks. Mobile Ad Hoc Networks (MANETs)	
14		LECTURE 14 Troubleshooting. Domain Name System (DNS)	

15		LECTURE 15 Computer network software Windows. Linux. UNIX and other operating systems	

Recommended Sources

TEXTBOOK(S)

1. Hajiyeva R.C. Informatics. Collection of lectures, Polygraphic and Publishing Center of the State University of Baku, Baku, 2020, 180 p.
2. Shirokova A.I., Pyshniak M. Informatics. Разработка программ на языке программирования Piton, M., 2020, 144 p.
3. Alizade M.N., Orujova T.V., Hasanova N.A. Information security. Baku, “MSV Publishing”, 2018, 388 p.
4. Alizadeh M.N., Gurbanov B.A., Hajizadeh S.M. Computer Graphics (Lecture materials and tests) Baku, “Sada” publishing house, 2010, 544 p.
5. Seyidzadeh E., Alizadeh M., Babayev A. Architecture of Computer Systems B: “Seda” 2011.
6. Savelyeva, A.Ya. Основы информатики/ Савельева, А.Я// Учебник для УЗов. -Moscow.: Просвещение. 2010.
7. S.Q. Karimov, S.B. Habibullayev, T.I. Ibrahimzade. Informatics. Textbook for higher education institutions. Baku, 2009.
8. Informatics for economists. Учебник для бачалериата и специалитета / ed. Poliakov V.P. M.: Yurayt, 2019. 524 c.
9. Nabiullina S.N. Informatics and ICT. Course lecture. M.: Lan, 2019. 72 p.
10. Gasumova S E. Social informatics. Textbook and practice for universities. M.: Yurayt, 2019. 284 c.
11. Abasov B. Microsoft Access database management system. Baku, 2009.
12. "Informatics for economists". Textbook. Under the editorship. prof. V. M. Matyushka. M., INFRA-M, 2006.
13. Mammadov F.O. “Microsoft Windows XP system” I, II parts. OKA publishing house, Baku 2009.
14. Mammadov F.O., Malikov G.Y., Muslimov V.B. “Microsoft Word” Baku 2007.
15. Guliyev H.M., Muslimov V.B., Hasanova P.M. “Microsoft Power Point” OKA Publishing House, Baku 2009.
16. Mardanov I.Dzh., R.I. Aliyarov "Краткий Курс Информатики" Chashoglu publishing house, Baku 2009.
17. Amirov Z.M. Microsoft Word 2003, Baku, "Elm", 2007.
18. Evdokimov V.V. Economic informatics, textbook for universities, St. Petersburg: Peter, 2011.

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

Course Policies
• Attendance of the course is mandatory. • Late assignments will not be accepted unless an agreement is reached with the lecturer. • Students cannot use calculators during the exam. • Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Methods of Algorithm Analysis and Design -1
Course Unit Code	İF-B20
Type of Course Unit	Compulsory
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Mustafayev Gorxmaz
Name of Lecturer(s)	Mustafayev Gorxmaz
Name of Assistant(s)	
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English

Prerequisites	-
Recommended Optional Program Components	-

Course description:

To teach students the concept of an algorithm, ways to evaluate its effectiveness, and basic algorithmic methods. The skills of analyzing algorithms and developing algorithmic solutions to various problems are formed.

Course Objectives:
This course covers the basic methods for designing and analyzing algorithms (chaining, divide and conquer, dynamic programming, etc.). Time and memory complexity of algorithms are taught. Students gain the ability to write algorithms and analyze their efficiency.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Will be able to explain the concept of algorithm and analysis;	1, 2
2	Will be able to solve problems using basic algorithmic methods;	1, 2
3	Will be able to perform complexity analysis with Big-O notation;	1, 2
4	Will be able to compare the advantages and disadvantages of different algorithms;	1, 2
5	Will be able to choose the optimal algorithm for simple practical problems.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5

10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction to Algorithm. Algorithm Concept	
2		LECTURE 2 Algorithm efficiency. Big-O notation	
3		LECTURE 3 Analysis of variables, time and memory	
4		LECTURE 4 Search algorithms	
5		LECTURE 5 Sorting algorithms	
6		LECTURE 6 Recursion and recursive algorithms	
7		LECTURE 7 Divide and conquer method	
8		LECTURE 8 In the practice of complexity analysis	
9		LECTURE 9 Mini projects and presentations	
10		LECTURE 10 Complexity analysis report	
11		LECTURE 11 Application of simple algorithms (binary search, bubble sort)	
12		LECTURE 12 Comparison of complex algorithms	
13		LECTURE 13 Mini project on problem solving	
14		LECTURE 14 Graph-based problem analysis	
15		LECTURE 15 Optimization with dynamic programming	

Recommended Sources

TEXTBOOK(S)

1. Cormen, Leiserson, Rivest, Stein – Introduction to Algorithms
2. Kleinberg, Tardos – Algorithm Design
3. Horowitz, Sahni – Fundamentals of Computer Algorithms
4. Skiena – The Algorithm Design Manual

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	
Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Methods of Algorithm Analysis and Design-2
Course Unit Code	İF-B21
Type of Course Unit	Compulsory
Level of Course Unit	4th year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	

Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Mustafayev Gorxmaz
Name of Lecturer(s)	Mustafayev Gorxmaz
Name of Assistant(s)	
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

To develop students' ability to design and analyze complex algorithms, and to introduce them to optimization and graph-based algorithms.

Course Objectives:
The course covers advanced techniques such as graph algorithms, dynamic programming, greedy methods, backtracking, and branch and bound.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Be able to apply graph algorithms	1, 2
2	Will be able to use dynamic programming methods;	1, 2
3	Able to implement backtracking and pruning techniques	1, 2
4	Will be able to recognize NP-complete and NP-hard problems;	1, 2
5	Be able to choose strategies for complex problems	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5

7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Graph concept and description	
2		LECTURE 2 Graph search (DFS, BFS)	
3		LECTURE 3 Minimal trees (Prim, Kruskal)	
4		LECTURE 4 Short-cut algorithms (Dijkstra, Floyd)	
5		LECTURE 5 Dynamic programming	
6		LECTURE 6 Greedy methods	
7		LECTURE 7 Backtracking and branch-and-bound	
8		LECTURE 8 NP-completeness and approximate algorithms	
9		LECTURE 9 Project presentations	
10		LECTURE 10 Graph-based problem analysis	
11		LECTURE 11 Optimization with dynamic programming	
12		LECTURE 12 Project with search and pruning methods	
13		LECTURE 13 Complex problem and algorithm comparison	
14		LECTURE 14 Divide and conquer method	
15		LECTURE 15 Mini projects and presentations	

Recommended Sources

TEXTBOOK(S)

1. Cormen et al. – Introduction to Algorithms
2. Kleinberg & Tardos – Algorithm Design
3. Dasgupta, Papadimitriou, Vazirani – Algorithms
4. Aho, Hopcroft, Ullman – The Design and Analysis of Computer Algorithms

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	
Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Parallel and Distributed Computations
Course Unit Code	İF-B22
Type of Course Unit	Compulsory
Level of Course Unit	3rd year
National Credits	

Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Aliyev Goshgar Seyfullah
Name of Lecturer(s)	Aliyev Goshgar Seyfullah
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Today's reality is that the development of almost any program requires good knowledge of parallel and distributed programming. Both of these areas are united by the fact that both parallel and distributed programs consist of several processes that together solve a common problem. However, it should be noted that the concepts of parallel and distributed data processing are not equivalent. Indeed, simultaneous means the simultaneous presence and execution of tasks. Distribution, on the other hand, refers to the spatial distance of processes from each other. In this case, tasks related to distributed data processing can be performed in several successive stages at different times. Of course, in some cases, parallel data processing can be effectively implemented using distributed software, especially when performing large amounts of calculations that are closely related to each other.

Course Objectives:

The aim of the course is to describe the basic concepts in the field of distributed computing, methods and algorithms for solving the most important problems for the model of asynchronous distributed systems are given. Special attention is paid to the logic clock mechanism, which greatly simplifies the development of algorithms for distributed systems. The main distributed algorithms for mutual exclusion are carefully considered. The study of these algorithms allows us to reveal important issues such as ensuring the security properties and survivability of distributed algorithms. The course material is accompanied by numerous examples showing the application of the studied methods and algorithms in solving real problems.

Learning Outcomes

At the end of the course the student will be able to know		Assessment
1	Basic concepts in distributed computing	1, 2
2	A logic clock mechanism that greatly simplifies the development of algorithms for distributed systems	1, 2
3	The basis for mutual exclusion should use distributed algorithms	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program		
		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 General information about parallel and distributed computing. Ways to increase computer performance	
2		LECTURE 2 Classification of parallel computer systems. Scalable parallel systems	
3		LECTURE 3 Basic concepts used in parallel and distributed computing	
4		LECTURE 4 Vector-conveyor type computers. Types of processors and arithmetic operations of vector computers	
5		LECTURE 5 Execution time of vector operations. Processor connection schemes in parallel computers	
6		LECTURE 6 Basic concepts of parallelization and vectorization	
7		LECTURE 7 Distributed and parallel computing: an introduction to CUDA technology	
8		LECTURE 8 Parallel and distributed computing: From graphics to CUDA. Basic concepts	

9		LECTURE 9 The main elements of a video card	
10		LECTURE 10 How to develop a program in CUDA	
11		LECTURE 11 Types of memory in CUDA. Caching	
12		LECTURE 12 Parallelization methods. Parallelization using blocks and streams	
13		LECTURE 13 Shared memory	
14		LECTURE 14 Calculating the scalar product of vectors. Function that calculates the smallest value	
15		LECTURE 15 Calculating the smallest price	

Recommended Sources

TEXTBOOK(S)

1. Alekperov R.Q., Hashimov M.A. On the prospects of applying cloud computing technologies in the AzScienceNet network // Problems of information technologies, 2012
2. Aliguliyev R.M., Abdullayeva F.C. Research and analysis of security problems of cloud technologies // Problems of information technologies, 2013
3. Alekperov R.G., Gashimov M.A. Technology development of distributed computing systems in a network environment. Express information. Series "Information technologies". Publishing house "Information technologies", 2015
4. Rashid Alekperov, Mammad Hashimov, Technologies for creating distributed computing systems in a network environment, 2015.
5. Tanenbaum E., van Steen M. Distributed systems. Principles and paradigms. - СПб: Peter, 2003. - 877 с.: ил.
6. Tel Zh. Introduction to distributed algorithms. Per. С энгл. – М.: МЦНМО, 2009. – 616 с.
7. Kshemkalyani AD, Singhal M. Distributed Computing: Principles, Algorithms, and Systems. Cambridge University Press, 2008.
8. Stallings W. Operating Systems: Internals and design principles. Seventh edition. Prentice Hall, 2011.
9. Tanenbaum A.S., van Steen M. Distributed Systems: Principles and Paradigms. Second edition. Pearson Prentice Hall, 2007.
10. Tel G. Introduction to Distributed Algorithms. Second edition. Cambridge University Press, 2000.
11. M.S. Kosyakov. Introduction to distributed computing. Study guide. Saint Petersburg, 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	
Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Artificial Intelligence
Course Unit Code	İF-B23
Type of Course Unit	Compulsory
Level of Course Unit	3
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Baghirova Vafa
Name of Lecturer(s)	Baghirova Vafa

Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

To teach students the theoretical foundations of machine learning, basic algorithms, and the application of these algorithms through the Python programming language. To develop the ability to analyze and build models on real data

Course Objectives:

The course covers the basic concepts, models, and algorithms of machine learning. Topics such as supervised and unsupervised learning methods, regression, classification, neural networks, SVM, PCA, anomaly detection, and recommender systems are taught in depth. Practical examples are provided using Python.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Will be able to explain the main types of machine learning algorithms;	1, 2
2	Will be able to build and evaluate simple and complex models using data;	1, 2
3	Will be able to implement regression, classification and clustering models in Python;	1, 2
4	Will be able to analyze overfitting/underfitting situations of the model;	1, 2
5	You will learn the basic concepts of neural networks and SVM;	1, 2
6	Will be able to apply recommendation systems and anomaly detection algorithms.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5

7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 What is machine learning? The essence of machine learning. Supervised, unsupervised learning. Linear regression	
2		LECTURE 2 Nonlinear regression models. Selection of regression models Building regression models in the Phton programming language	
3		LECTURE 3 Logistic regression. Classification Discriminant and generative model Logistic regression model. Value function for logistic regression Sigmoid function Interpretation of hypothesis output	
4		LECTURE 4 Regularization. Generalization, low fit and high fit Regularization of linear regression. Regularization of logistic regression	
5		LECTURE 5 Training and validation datasets. Unbiased cross-validation. Selection model	
6		LECTURE 6 Variance and Bias. Tuning the learning algorithm. Training and validation datasets. Unbiased cross-validation. Selection model	
7		LECTURE 7 Neural networks. Neural models. Vectorized execution. Feedforward. Activation functions	
8		LECTURE 8 K-fold algorithms. Clusters. Random initialization. Choosing the number of clusters.	
9		LECTURE 9 SVM1. Linearly separable data. Separation by hyperplane. SVM Lagrangian problem	
10		LECTURE 10 Dimensionality reduction. Data visualization. PCA	
11		LECTURE 11 Anomaly detection. Gaussian distribution Anomaly detection algorithm	
12		LECTURE 12 Recommendation systems. Content-based recommendations Collaborative filtering. Optimization	
13		LECTURE 13 SVM2. Kernel types. Gaussian kernel. Multi-class SVM	
14		LECTURE 14 Neural network concept	

15		LECTURE 15 Principal component analysis. Updating weights in the simplest neural network	

Recommended Sources

TEXTBOOK(S)

1. Aurélien Géron – Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow
2. Tom Mitchell – Machine Learning
3. Ian Goodfellow, Bengio & Courville – Deep Learning
4. Trevor Hastie et al. – The Elements of Statistical Learning
5. Kevin Murphy – Machine Learning: A Probabilistic Perspective
6. Andreas Müller, Sarah Guido – Introduction to Machine Learning with Python

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

Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Complex Analysis
Course Unit Code	İF-B24
Type of Course Unit	Compulsory
Level of Course Unit	4th year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Taghiyev Rauf
Name of Lecturer(s)	Taghiyev Rauf
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The goal of this subject is to teach students the theory of functions based on complex numbers, to master the properties of analytic functions, integration and residue methods, and to instill the ability to use this knowledge in solving real and applied problems.

Course Objectives:
The subject of complex analysis covers the basics of functions of complex variables, complex integrals, Cauchy's theorem, residue theorem, Laurent and Taylor series, and properties of analytic functions. The subject both forms fundamental mathematical thinking and serves as a basis for applications in physics and engineering.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Be able to explain complex numbers and their geometric interpretation	1, 2

2	Be able to define the concept and basic properties of analytic functions	1, 2
3	Be able to apply Cauchy's integral theorem and its results	1, 2
4	Laurent and Taylor will be able to build their ranks	1, 2
5	Will perform integral and one-dimensional calculations using the residue theorem	1, 2
6	Be able to apply existing methods to solve practical problems	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Complex numbers and their geometric representation	
2		LECTURE 2 Complex functions and their limits	
3		LECTURE 3 Analytic functions and Cauchy-Riemann equations	
4		LECTURE 4 Elementary functions	

5		LECTURE 5 Complex differentiation	
6		LECTURE 6 Complex integrals and Cauchy's theorem	
7		LECTURE 7 Cauchy integral formula	
8		LECTURE 8 Analyticity and its consequences: infinite differentiation	
9		LECTURE 9 Taylor series	
10		LECTURE 10 Laurent series and their applications	
11		LECTURE 11 Singular points and their types	
12		LECTURE 12 The residue theorem and its application	
13		LECTURE 13 Calculating the real integral using the complex method	
14		LECTURE 14 Harmonic functions and conformal transformations	
15		LECTURE 15 Application areas of complex analysis and general repetition	

Recommended Sources

TEXTBOOK(S)

1. Brown, J.W., Churchill, R.V. Complex Variables and Applications.
2. Marsden, J.E., Hoffman, M.J. Basic Complex Analysis.
3. Ablowitz, M.J., Fokas, A.S. Complex Variables: Introduction and Applications
4. Saff, E.B., Snider, A.D. Fundamentals of Complex Analysis with Applications to Engineering and Science.
5. Lang, S. Complex Analysis.
6. Conway, J.B. Functions of One Complex Variable

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	
Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Optimization Methods
Course Unit Code	İF-B25
Type of Course Unit	Compulsory
Level of Course Unit	4
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Taghiyev Rauf
Name of Lecturer(s)	Taghiyev Rauf
Name of Assistant(s)	-
Mode of Delivery	Face to face

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

Course description:
To teach students the basics of optimization theory, linear and nonlinear optimization methods, solutions to multi-objective and constrained problems, and to form the ability to apply this knowledge in areas such as information security, network optimization, and risk minimization.

Course Objectives:
The course “Optimization Methods” teaches students to apply more efficient and scientific approaches to the decision-making process. The course covers topics such as basic concepts of optimization theory, classical linear and nonlinear programming models, duality, transportation problems, dynamic programming, network flows, integral programming, and multi-objective optimization. Students will also learn the application of these methods to real-world problems such as information security, network planning, resource management, and risk mitigation with practical examples. The course aims to develop students' analytical and computational skills by combining both theoretical and practical approaches.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Understand the structure and objective function of an optimization problem	1, 2
2	Will apply linear programming methods (Simplex, binary simplex)	1, 2
3	Distinguish between nonlinear, integer, and dynamic programming methods	1, 2
4	Will conduct the construction and analysis of binary problems	1, 2
5	It will show the applications of optimization in information security.	1, 2
6	Model real-life optimization problems and solve them through programming	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine	4

	project effectiveness	
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction to the optimization problem and basic concepts	
2		LECTURE 2 Objective function and constraint analysis	
3		LECTURE 3 Linear programming: model building and the Simplex method	
4		LECTURE 4 Simplex method solution steps and main tasks	
5		LECTURE 5 Binary problem and duality theory	
6		LECTURE 6 Binary simplex method	
7		LECTURE 7 Optimization of transportation and task issues	
8		LECTURE 8 Integer programming methods	
9		LECTURE 9 Fundamentals of dynamic programming	
10		LECTURE 10 Nonlinear optimization: analysis and examples	
11		LECTURE 11 Optimization with Lagrange multipliers	
12		LECTURE 12 Graph models and network flow optimization	
13		LECTURE 13 Heuristic and metaheuristic methods (Genetic algorithm, Simulated Annealing)	
14		LECTURE 14 Multi-objective optimization and trade-off models	
15		LECTURE 15 Applications of optimization in information security and network management	

Recommended Sources

TEXTBOOK(S)

1. Taha H.A. — Operations Research: An Introduction
2. Hillier, F.S. & Lieberman, G.J. — Introduction to Operations Research
3. Bazaraa, M.S., Jarvis, J.J., Sherali, H.D. — Linear Programming and Network Flows
4. Winston, W.L. – Operations Research: Applications and Algorithms, Cengage Learning
5. Nemhauser, G.L. & Wolsey, L.A. – Integer and Combinatorial Optimization

6. Boyd, S. & Vandenberghe, L. – Convex Optimization
7. Fletcher, R. – Practical Methods of Optimization
8. Chvatal, V. – Linear Programming
9. Gass, SI – Linear Programming: Methods and Applications
10. Papadimitriou, C., Steiglitz, K. – Combinatorial Optimization: Algorithms and Complexity

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

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

Computer Science bachelor program, Department of "Ecology and Environment"

Course Unit Title	Civil Defense

Course Unit Code	İF-B26
Type of Course Unit	Compulsory
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hours/week)	1
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Amrahov Elshan Shirin
Name of Lecturer(s)	Amrahov Elshan Shirin
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani
Prerequisites	-
Recommended Optional Program Components	-

Course description:

As a sovereign state, Azerbaijan solves all security problems on its own, therefore, when developing our 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 must be taken into account, and this factor must be taken into account in protection programs.

Secondly, we must not forget that our country borders on states that possess nuclear weapons or have nuclear munitions stored on their territory. Therefore, when planning and implementing Civil Defense (CD) measures, they cannot be reduced to protecting the population, as well as national economic facilities, from weapons of mass destruction (WMD). The protection system faces the problem of protection from man-made and natural disasters.

Course Objectives:

Civil Defense (CD) is the science of protecting human safety and health in the environment. It should identify and define dangerous and harmful factors, study methods and means of human protection, ways to minimize harmful and dangerous factors, and develop measures to eliminate the consequences of accidents and disasters occurring in peacetime and wartime.

Emergency events that cause large material losses and human casualties (accidents at nuclear power plants, railways, enterprises using highly reactive substances, and frequent natural disasters, etc.) show that the MM measures, especially for emergencies of peace 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

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 subject of Civil Defense;	1, 2
2	Formation of ideas about the means of training in Civil Defense;	1, 2
3	Formation of ideas about the forms of organizing Civil Defense training;	1, 2
4	Formation of ideas about the goals and objectives of the methodology of teaching Civil Defense, scientific research methods, and its relationship with other sciences	1, 2
5	Formation of ideas about the forms of organizing Civil Defense training	1, 2
6	Formation of ideas about the principles and training methods of Civil Defense training	1, 2
7	Formation of the ability to make logical judgments, draw conclusions and justify them	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	3
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	2
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	3
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	2

7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	2
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	2
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	2

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 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		SEMINAR 1	
3		LECTURE 2 Classification of emergencies	
4		SEMINAR 2	
5		LECTURE 3 Understanding weapons of mass destruction. Nuclear weapons and their damaging factors. Conventional means of destruction	
6		SEMINAR 3	
7		LECTURE 4 Basic characteristics of radiation chemical reconnaissance and dosimetric devices and rules for their use	
8		SEMINAR 4	
9		LECTURE 5 Rules for the use of personal protective equipment in emergency situations	
10		SEMINAR 5	
11		LECTURE 6 Basic principles and methods of population protection in emergency situations. Collective protection devices	
12		SEMINAR 6	
13		LECTURE 7 Emergency evacuation of the population	
14		SEMINAR 7	
15		Carrying out rescue and other urgent (Emergency and Disaster Management) tasks. SEMINAR 8	

Recommended Sources
TEXTBOOK(S)

1. R. Guliyev, O. Salayev, J. Dadashov, T. Hamzabeyova “Civil Defense” Baku – 2022
2. Methods and tactics for fighting wildfires. EuroFire © September 2008
3. Album of schemes on the subject of "Civil Defense" Baku-2019
4. Basic Safety Rules. Ministry of Emergency Situations Baku-2016
5. Tural Amirkhanle. Primary fire extinguishing means. Baku 2004
6. Malik Abbasov, Shamil Guliyev. First aid. Baku 2017
7. Urgent first aid. Ministry of Emergency Situations Baku-2015
8. Ojagov H.O. Safety of life in emergency situations. Baku 2010
9. N.M. Hajyyev, S.H. Mahmudov. Civil defense in the agricultural sector. Ganja - 2012
10. Ojagov H.O. Elimination of the consequences of emergency situations. Baku, 2009.
11. Ojagov H.O. Safety of life activities in emergency situations (Textbook for higher education institutions). Chasioglu, Baku, 2002
12. Ojagov H.O. Civil defense protection facilities. 1993
13. Ojagov H.O. Safety of life in emergencies (Civil defense). Baku, 2002
14. Ojagov H.O. Civil defense protection devices. Baku, 2003
15. Ojagov H.O. Emergency Management. Baku, 2008
16. Ojagov H.O., Danyalov Sh.D. Theoretical foundations of life safety. Baku, 2008
17. "Civil Defense". Karimov Officer Samad Baku 2013
18. Karimov Z.S. Safety of life activities, labor protection. Baku, 2016
19. R. Guliyev, O. Salayev, J. Dadashov, T. Hamzabeyova Civil Defense Baku, 2022
20. Head of the Academy of the Ministry of Emergency Situations of the Republic of Azerbaijan Major General Baba Salayev, Colonel Ilham Babashov, Lieutenant Colonel Rafael Mustafayev “The Book of the Rescuer” Baku, 2021
21. Decree No. 1182 of the President of the Republic of Azerbaijan dated December 16, 2005.
22. Law of the Republic of Azerbaijan on the Ministry of Finance, Baku, April 18, 1998;
23. Resolution of the Cabinet of Ministers on the Ministry of Finance, No. 193, Baku, September 25, 1998;
24. In the Regulation No. 394 dated 19.04.2006 on the Ministry of Emergency Situations of the Republic of Azerbaijan,
25. In the Regulation No. 511 dated 29.12.2006 on Civil Defense Troops of the Ministry of Emergency Situations of the Republic of Azerbaijan.
26. Constitution of the Republic of Azerbaijan. Baku: Azernashr, 1996
27. Law of the Republic of Azerbaijan on Civil Defense. Baku: Azernashr, 1999

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

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Computer Modeling
Course Unit Code	ATMF-B01
Type of Course Unit	Elective
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	2

Course Coordinator	Sema Bayramova
Name of Lecturer(s)	Sema Bayramova
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Brief information about the subject, the purpose of teaching the subject, and the methods to be applied in teaching the subject are explained in writing. It is stated what students will know, what they will achieve, and what skills they will acquire by studying this subject.) Computer modeling used to solve many problems. Computer modeling It is widely spread in science, business, etc. fields, making a person's professional possibilities endless.

Course Objectives:

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

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 of "computer modeling" as a science, scientific research methods, and its relationship with other sciences;	1, 2
2	Formation of ideas about the forms of application of the subject "Computer Modeling"	1, 2
3	Formation of ideas about "computer modeling" tools	1, 2
4	Formation of ideas about the principles and teaching methods of the subject "Computer Modeling"	1, 2
5	Formation of ideas about the goals and objectives of the subject "Computer Modeling" among undergraduate students	1, 2
6	Completion of practical tasks used in the subject "Computer Modeling" by undergraduate students	1, 2
7	Monitoring and investigating the level of performance of practical tasks	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals	5

	to create computational solutions	
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Computer modeling as a method of scientific cognition. Modeling methods. Advantages of computational experimentation Concepts of model and modeling	
2		LECTURE 2 Model characteristics. Objectives of modeling	
3		LECTURE 3 Classification of models. Classification of information models	
4		LECTURE 4 Development of graph information model problems	
5		LECTURE 5 Modelingand systematic approach.Principles of computer modeling. Relationship with other methods of knowledgeLife cycle and applications of the modeled system	
6		LECTURE 6 Classification scheme of a mathematical model according to hierarchical level and the nature of the described properties of the object	
7		LECTURE 7 Architectural scheme of an economic model. Classification of knowledge models.Isimulation modeling of production systems	
8		LECTURE 8 Architecture of a complex system simulation model	
9		LECTURE 9 Computer graphics. Using software packages to model technical systems	
10		LECTURE 10 Application areas of computer modelsMonte Carlo method	

11		LECTURE 11 Corel draw tutorials. Corel draw tutorials- use panel	
12		LECTURE 12 Corel Draw tutorials-tools panel	
13		LECTURE 13 Corel draw tutorials-text-tool-paragraph tool. Corel draw tutorials-create business card	
14		LECTURE 14 Corel Draw tutorials-shortcuts	
15		LECTURE 15 Corel draw tutorials-drop shadow, contour. Corel draw tutorials-artistic media tool	

Recommended Sources

TEXTBOOK(S)

1. McGraw-Hill Publishing Co. ISBN: 0071255192. (2023): Simulation Modeling and Analysis (An outstanding reference for simulation students and researchers)
2. Ahmadov M.A., Mahammadli HM Methods of automated modeling and research of information systems. Sumgayit, 2015, 135 p.
3. Alizade A.N., Namazov M.B., Aslanov M.S. Matlab application package and symbolic mathematics. Textbook. Baku, 2005, 280 p.
4. Mamedov J.F. Magamedli H.M. Modeling of GPM in the form of finite automata and research by analysis of the main properties of the Petri net / Proceedings of the XVI International Open Conference "Modern problems of informatization in modeling and social technologies". вып.16, Voronezh: Научная книга, 2011, p.260-264.
5. Mammadov H.A., Rustamov G.A., Rustamov R.G. Engineering mathematics. Textbook, AzTU, - 2015, - 440 p.
6. Rustamov G.A. Theory of automatic regulation. Modeling in Matlab Simulink, Baku, 2012, 750 p.
7. Sadigov Z.A., Mahammadli HM Algorithm for transformation of input information described by production models into a Petri net. / Proceedings of the sixth International Scientific and Technical Conference "Microelectronic converters and devices based on them". Baku-Sumgait, 2002, pp. 155-156

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	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Desıgn Of Computer Systems
Course Unit Code	ATMF-B01
Type of Course Unit	Elective
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Gurban Muradov
Name of Lecturer(s)	Gurban Muradov
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, 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.

Course Objectives:

Computer systems designThe purpose of the subject "Information resources are rapidly increasing in connection with the development of Internet technologies in telecommunications, new information relations and forms of employment are emerging. In the current conditions, scientific knowledge and information resources are considered the main scientific, economic and moral wealth of society. The Internet has wide opportunities in the formation of public opinion, in making decisions in the political, economic and military spheres, in influencing the information resources of the enemy, and also in the dissemination of specially prepared false information. The active use of the Internet network for waging information warfare is explained by its superiority over traditional methods (mass media) and technologies

Learning Outcomes		
At the end of the course the student will be able to know		Assessment
1	Communication processes	1, 2
2	Information transmission systems	1, 2
3	Internet services	1, 2
4	VPNs, their creation	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Project preparation and planning	

2		LECTURE 2 Development stages of software and applications	
3		LECTURE 3 IT infrastructure preparation and management IT infrastructure preparation and management	
4		LECTURE 4 Testing and inspection methods	
5		LECTURE 5 Ensuring project safety	
6		LECTURE 6 Developing user-centered projects	
7		LECTURE 7 Ensuring speed and performance	
8		LECTURE 8 Updating projects and adding new functionality	
9		LECTURE 9 Management, monitoring and technical support	
10		LECTURE 10 Data analytics and database management	
11		LECTURE 11 Application of new technologies: Cloud technology	
12		LECTURE 12 IT project evaluation and financial management	
13		LECTURE 13 Basic project management methods	
14		LECTURE 14 Open source project management	
15		LECTURE 15 Provision and integration of high-scale infrastructure	

Recommended Sources

TEXTBOOK(S)

1. KOODLI, R., and PERKINS, CE: Mobile Inter-networking with IPv6, New York: John Wiley & Sons, 2022.
2. KOOPMAN, P.: ''32-Bit Cyclic Redundancy Codes for Internet Applications,'' Proc. Intl. Conf. on Dependable Systems and Networks., IEEE, pp. 459–472, 2020.
3. Karimov S.Q., Habibullayev S.B., Ibrahimzade T.I.. Informatics. Textbook for higher education institutions. Baku, 2019.
4. Hajiyeva R.C. Informatics Baku, Publishing and Printing Center of the State University of Economics, 2022.
5. Aliyev A.Y. Informatics and programming. Baku, Mtsyarim, 2018.
6. A. Sergeev. Fundamentals of local computer networks. Moscow, 2016.
7. A. Robachevsky. Internet from within. Ecosystem global network. Moscow, 2017.
8. T.I. Aliyev., Computers and telecommunication networks. - St. Petersburg, 2011.400p.
9. E. Tanenbaum. Computer architecture. 5th edition. (+CD). СПб.: Peter, 2007.-844с.: ил.
10. “Law of the Republic of Azerbaijan on Access to Information”, Baku, September 30, 2005, No. 1024-IIQ
11. “Law of the Republic of Azerbaijan on Electronic Signature and Electronic Document”, Baku, March 9, 2004, No. 602-IIQ
12. V.L. Broydo. Computing systems, networks and telecommunications: Uchebnik dlya uzov. -SPb.: Peter, 2004.-703.:il.
13. https://www.youtube.com/watch?app=desktop&v=0HXhLhXPlBc

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	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Computer Graphics
Course Unit Code	ATMF-B02
Type of Course Unit	Elective

Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	1
Course Coordinator	Aliyev Goshgar
Name of Lecturer(s)	Aliyev Goshgar
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Working with computer graphics is one of the most common areas of using a personal computer."Computer graphics"The training course is designed for computer owners who are trying to master the capabilities of modern computer graphics, as well as advertising, designer, and public relations specialists who are able to work at a beginner level on a personal computer. "Computer graphicsThe purpose of teaching the subject "Computer Graphics and Multimedia" is to provide students with detailed information about currently available computer graphics and multimedia tools, their development history and directions, as well as their application areas, and to instill in them the skills to use computer graphics and multimedia tools in practice.

Course Objectives:

In the teaching of the subject, students are provided with detailed information about the basic concepts and types of computer graphics, solutions for various devices and images, computer representation of graphic information, various types of computer graphics and multimedia tools, encoding of graphic images, various color models, requirements for choosing a color rendering model, graphic file formats, equipment intended for working with images and requirements for their selection, simple and professional multimedia technologies and their capabilities, application areas and features.The main goal of the subject being taught is to assist students in their independent work and to increase the effectiveness of their mastery of the subject.

Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	Formation of ideas about the basic concepts and types of computer graphics	1, 2
2	formation of the necessary knowledge and skills about various devices and image solutions;	1, 2
3	Formation of ideas about various types of computer graphics and multimedia tools	1, 2
4	Formation of the ability to apply various color models and color rendering models	1, 2
5	Formation of ideas about the equipment intended for working with images and the requirements for their selection	1, 2
6	Formation of the ability to use simple and professional multimedia technologies	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1. Computer graphicsBasics of. Types of computer graphics and their characteristics	
2		LECTURE 2. Advantages and disadvantages of raster and vector graphics	
3		LECTURE 3. Computer graphicsGeneral classification of graphic programs used in	
4		LECTURE 4. Classification and purpose of modern graphic editors and programs	
5		LECTURE 5. Adobe Photoshop: Purpose and capabilities of the program	
6		LECTURE 6. Graphic file formats. Overview of image file types. Classification of basic formats. Application areas and main features of various formats	
7		LECTURE 7. Layers and color channels in Adobe Photoshop	
8		LECTURE 8. Color models. Additive and subtractive color models. Color manager. Primary, secondary, and derived colors	
9		LECTURE 9 Creating collages and montages in Adobe Photoshop	
10		LECTURE 10 CorelDraw: Toolbar and effects menu	
11		LECTURE 11 CorelDraw vector graphics program. Purpose and capabilities of the program	
12		LECTURE 12 CorelDraw: Creating simple and complex shapes	
13		LECTURE 13 CorelDraw: transition from raster graphics to vector graphics	
14		LECTURE 14 CorelDraw: Working with text. Formatting and editing text	
15		LECTURE 15 CorelDraw: Editing the color fill and outline of an object	

Recommended Sources

TEXTBOOK(S)

1. Hajiyeva R.C. Informatics. Collection of lectures, Polygraphic and Publishing Center of the State University of Baku, Baku, 2020, 180 p.
2. Adobe Photoshop Classroom in a Book (2023 release) By Conrad Chavez. Published Dec 6, 2022 by Adobe Press.
3. Seyidzade E.V., Alizade M.N. Corel DRAW 12. Textbook "MSV PUBLICATION". Baku, 2006, 280 pages.
4. Faulkner, Chavez: Adobe Photoshop CC. Official course. Exmo-Press, 2021. 448 c.
5. Toporkov C. Adobe Photoshop CS in examples, изд-во «БХВ-Петербург», 2005, 384 стр.

6. CorelDRAW 2020 tutorial / H.B. Komolova, E.C. Yakovleva. — СПб.: БХВ-Петербург, 2021. — 416 с. 7. A.S. Rukavishnikova. "Technical drawing in CorelDRAW", 2023. - 257 str. 262 illustrations		
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	
Total Workload	**150**
Total Workload/30(h)	**150/30**
ECTS Credits of the Course	**5**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Application Software Package
Course Unit Code	ATMF-B02

Type of Course Unit	Elective
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Ahmadova Esmira
Name of Lecturer(s)	Ahmadova Esmira
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject "Application software package" is about application programs, which constitute an important part of software, their features and uses.covers topics. Among these topics are "Software system", "Application software composition", "Mathematical software packages", etc. topics.

Course Objectives:

The purpose of the subject “Application software package” is to form a worldview, relevant knowledge and skills about applied programs, their characteristics and applications.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Application software contentand forming ideas about opportunities	1, 2
2	Using application programs in organizing and researching various modelsformation of ideas and skills about	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	4
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	3
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Software system	
2		LECTURE 2 Application software content	
3		LECTURE 3 Modeling tools	
4		LECTURE 4 Use of application programs in organizing and studying various models	
5		LECTURE 5 Mathematical software packages	
6		LECTURE 6 Basic capabilities of the Matlab application package.	
7		LECTURE 7 Calculations and graphs in Matlab	
8		LECTURE 8 General purpose application software packages	
9		LECTURE 9 Method-oriented application software packages	

10		LECTURE 10 Problem-oriented application software packages	
11		LECTURE 11 MS Office software package	
12		LECTURE 12 TPP of global computer networks	
13		LECTURE 13 Database management systems	
14		LECTURE 14 Geographic information systems	
15		LECTURE 15 Expert systems	

Recommended Sources

TEXTBOOK(S)

1. Trofimov V.V. Informatics. Textbook for academic bachelor's degree. In 2 volumes. Volume 2. M.: Jurayt, 2019. 406p.
2. Filimonova E.B. Informatics and information technologies in professional activity. Textbook. M.: Justitia, 2019. 216 c.
3. Karimov SQ Habibullayev SB Ibrahimzade T.I. "Informatics". Baku. 2011.
4. Mammadov H.A., Rustamov G.A., Rustamov R.G. Engineering Mathematics. Baku-2015.
5. Gurbanov I.A., Gurbanov A.I. “Mathematical software packages”. Baku, 2015, 168 p.
6. D. Baird. Engineering mathematics. M.: Publishing house "Dodeka-XX", 2008, 544 p.
7. Ketkov Yu.L., Ketkov A.Yu., Shul M. M. K37 MATLAB 7: programming, numerical methods. — СПб.: БХВ-Петербург, 2005. — 752 с.
8. Lazarev Yu.F. Beginning of programming in MatLAB environment. Study guide for students of higher educational institutions. Kiev – НТУУ "КПИ" – 2003, 424 с.
9. Potemkin V.G. Introduction to Matlab. Moscow, 2000.

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

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Human-Computer Interface (UI/UX)
Course Unit Code	ATMF-B03
Type of Course Unit	Elective
Level of Course Unit	2
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Hamidova Raksana Eyvaz

Name of Lecturer(s)	Hamidova Raksana Eyvaz
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The aim of this course is to teach students the basic principles, tools and methods of human-computer interface (HCI), user experience (UX) and user interface (UI) design. Through the course, students will learn to develop interactive and user-friendly interfaces by effectively using the psychology of design, the principle of user-centered design, and design tools such as Figma, and then implement these designs in code.

Course Objectives:

This subject covers the areas of human-computer interface and UX/UI design. Within the scope of the subject, students are provided with detailed information about the basics of user experience and interface design, modern design tools (especially Figma) and practical applications of design. The subject also covers the basic principles of visual design, creating interactive prototypes and implementing designs with code. Through practical lessons, students will be taught how to connect coding with design and how to apply various design elements.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	They will understand the basic concepts and principles in the fields of human-computer interface, UX, and UI design	1, 2
2	They will be able to effectively use design tools like Figma	1, 2
3	They will create prototypes and interfaces applying user-centered design principles	1, 2
4	They will create user-friendly designs by applying basic visual design principles.	1, 2
5	They will convert designs into websites using HTML, CSS, and JavaScript	1, 2
6	They will refine their designs by subjecting their prototypes to user testing.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL

1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	4
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 What is Human-Computer Interface? Differences between UX (User Experience) and UI (User Interface)	
2		LECTURE 2 History of HCI and UX/UI design. Key concepts: Ergonomics, interactivity, response time	
3		LECTURE 3 First UX/UI Principles and Philosophy	
4		LECTURE 4 Basic UX principles: user requirements, simplicity, reliability, sustainability. Visual hierarchy and connectivity in UI design	
5		LECTURE 5 The Psychology of Design: User Behaviors and Reactions	
6		LECTURE 6 First UI Design: Basic Terms and Components	
7		LECTURE 7 Design schemes and color palettes. Grid system and guidelines	

8		LECTURE 8 Introducing and Installing Figma	
9		LECTURE 9 Basic Design Operations with Figma	
10		LECTURE 10 Creating images, buttons, and text areas. Using Figma tools: Rectangle, Circle, Line, Text	
11		LECTURE 11 Creating Prototypes and Interactive Designs	
12		LECTURE 12 Adding transitions, animations, and interactivity. Figma's Linking feature	
13		LECTURE 13 Application with Basic UX/UI Design Principles	
14		LECTURE 14 Coding from Figma: Advancing Design with Code	
15		LECTURE 15 Responsive Web Design (RWD) and Mobile Compatibility	

Recommended Sources

TEXTBOOK(S)

1. **Don't Make Me Think: A Common Sense Approach to Web Usability”**-Steve Krug
2. This book explains the basic concepts of user experience and interface design in a simple and practical way.
3. **"The Design of Everyday Things"**-Don Norman
4. A fundamental resource on HCI and the psychology of design. It provides an in-depth explanation of user-centered design principles.
5. **"Lean UX: Applying Lean Principles to Improve User Experience"**- Jeff Gothelf
6. It teaches the application of Lean UX methodology and how to rapidly improve user experience.
7. **"Universal Principles of Design"**- William Lidwell, Christina Holden, Jill Butler
8. It is a resource that covers the basic principles and best practices of design.
9. **“Figma for UX/UI Design”**- Figma Design Team
10. Provides detailed information about the usage instructions and design tools of Figma.

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	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Information and Communication Systems
Course Unit Code	ATMF-B03
Type of Course Unit	Elective
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2

Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Sema Bayramova Gadir
Name of Lecturer(s)	Sema Bayramova Gadir
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, 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.

Course Objectives:

The purpose of the subject "Information and communication systems" - In connection with the development of Internet technologies of telecommunications, information resources are rapidly increasing, new information relations and forms of employment are emerging. In the current conditions, scientific knowledge and information resources are considered the main scientific, economic and spiritual wealth of society. The Internet has wide opportunities in the formation of public opinion, in making decisions in the political, economic and military spheres, in influencing the information resources of the enemy, and also in the dissemination of specially prepared false information. The active use of the Internet network for waging information warfare is explained by its superiority over traditional methods (mass media) and technologies.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Information and communication systemsFormation of ideas about the goals and objectives of the discipline as a science, scientific research methods, and its relationship with other sciences	1, 2
2	For students studying at the bachelor's level, Formation of ideas about the goals and objectives of the training "Information and communication systems"	1, 2
3	For students studying at the bachelor's level, "Information and communication systems"Performance of practical tasks used in the training of the course;	1, 2
4	Monitoring the level of performance of practical tasks	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program		
		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents			
Week	Chapter	Topics	Exam
1		LECTURE 1 A systematic approach to communication processes. Elementary structure of a communication system	
2		LECTURE 2 Communication means – communication lines	
3		LECTURE 3 Communication networks	
4		LECTURE 4 Communication devices	
5		LECTURE 5 Switching methods and technologies in global networks	
6		LECTURE 6 Technologies on the network	
7		LECTURE 7 OSI model	

8		LECTURE 8 OSI model levels	
9		LECTURE 9 Stages of creating information systems. Stages of the IS life cycle. Life cycle models of information systems	
10		LECTURE 10 VBIS. Problem Solving	
11		LECTURE 11 Biometrics	
12		LECTURE 12 Geographic information systems	
13		LECTURE 13 Internet	
14		LECTURE 14 Address management on the Internet	
15		LECTURE 15 Solving Excel problems	

1. KOODLI, R., and PERKINS, CE: Mobile Inter-networking with IPv6, New York: John Wiley & Sons, 2022.
2. KOOPMAN, P.: ''32-Bit Cyclic Redundancy Codes for Internet Applications,'' Proc. Intl. Conf. on Dependable Systems and Networks., IEEE, pp. 459–472, 2020.
3. Karimov SQ, Habibullayev SB, Ibrahimzade T.I.. Informatics. Textbook for higher education institutions. Baku, 2019.
4. Hajiyeva RC Informatics Baku, Publishing and Printing Center of the State University of Economics, 2022.
5. Aliyev A.Y. Informatics and programming. Baku, Mtsyarim, 2018.

Additional textbooks, materials and resources:

1. A. Sergeev. Fundamentals of local computer networks. Moscow, 2016.
2. A. Robachevsky. Internet from within. Ecosystem global network. Moscow, 2017.
3. T.I. Aliyev., Computers and telecommunication networks. - St. Petersburg, 2011.400p.
4. E. Tanenbaum. Computer architecture. 5th edition. (+SD). SPb.: Peter, 2007.-844 c.: ил.
5. “Law of the Republic of Azerbaijan on Access to Information”, Baku, September 30, 2005, No. 1024-IIQ
6. “Law of the Republic of Azerbaijan on Electronic Signature and Electronic Document”, Baku, March 9, 2004, No. 602-IIQ
7. V.L. Broido, Computing systems, networks and telecommunications: Учебник для узов. -SPb.: Peter, 2004.-703.:il.
8. https://www.youtube.com/watch?app=desktop&v=0HXhLhXPlBc

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	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Systematic Analysis
Course Unit Code	ATMF-B04
Type of Course Unit	Elective
Level of Course Unit	2
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	4

Course Coordinator	Ahmadova Esmira Nariman
Name of Lecturer(s)	Ahmadova Esmira Nariman
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

"Systems analysis" is a scientific and methodological discipline that studies the methods, tools, and principles of describing complex objects as systems and analyzing these systems. Systems analysis is a set of concepts, methods, and technologies for studying, describing, and creating various systems (processes and phenomena).

Course Objectives:

The purpose of the subject "Systems Analysis" is to study the role, characteristics, principles, stages, and methods of system modeling of systemic analysis and systemic approach in solving management problems.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Formation of ideas about the purpose, subject and basic concepts of the subject	1, 2
2	formation of ideas about systems analysis; formation of ideas about the systematic approach, its essence and principles	1, 2
3	Formation of ideas about the features of a systematic approach in solving management problems Formation of ideas about modeling	1, 2
4	ideas about building a system model	1, 2
5	Formation of ideas about computer modeling, stages, and instrumental tools	1, 2
6	requirements analysis and initial system design concepts	1, 2
7	Formation of ideas about the application of situation modeling in decision-making	1, 2
8	Formation of the ability to describe simple objects as systems	1, 2
9	Formation of the ability to classify objects according to various characteristics	1, 2
10	Formation of the ability to conduct system analysis of simple systems	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	5
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	5
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 The purpose, subject and basic concepts of the subject	
2		LECTURE 2 System analysis	
3		LECTURE 3 Systematic approach, its essence and principles	
4		LECTURE 4 A systematic approach to studying and improving complex systems	
5		LECTURE 5 Stages of systematic analysis in solving management problems.	
6		LECTURE 6 Modeling	
7		LECTURE 7 Types of modeling	

8		LECTURE 8 Information modeling	
9		LECTURE 9 Classification of information models	
10		LECTURE 10 The main stage of systematic analysis is building a model of the object under study.	
11		LECTURE 11 Computer modeling, stages, instrumental tools	
12		LECTURE 12 Mathematical modeling	
13		LECTURE 13 Modeling problems	
14		LECTURE 14 Modeling a system under conditions of certainty.	
15		LECTURE 15 Requirements analysis and preliminary system design	

Recommended Sources

TEXTBOOK(S)

1. Karimov S.Q. Information systems. -Baku: Elm, 2008, 676p.
2. Sardarov Y.B. Mathematical elements of informatics and computing /Textbook/. – Baku, 2006. – 102 p.
3. Bakhvalov L. Types of modeling. Computer modeling. http://bourabai.kz/cm/bahvalov2.htm
4. Gubanov V.A., Zakharov V.V., Kovalenko A.N. Introduction to system analysis. L.: Изд-во Ленин-градского ун-та, 1988. 232 с.
5. Prokhorov Yu.K., Frolov V.V. Management decisions. С.Пт – 2011.
6. Safronov V. System analysis.Electronic textbook: http://victor-safronov.ru/systems-analysis/lectures/kaziev.html
7. Yu.Yu. Gromov, N.A. Zemskoi, A.V. Lagutin and others. System analysis in information technologies. Учеб. allowance. Tambov: Изд-во Тамб. Gos. technical University, 2004. 176 str

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

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Fundamentals of Circuit Design
Course Unit Code	ATMF-B04
Type of Course Unit	Elective
Level of Course Unit	2
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Sema Bayramova Gadir

Name of Lecturer(s)	Sema Bayramova Gadir
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, 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.

Course Objectives:

The purpose of the subject "Fundamentals of Circuit Engineering" - Circuit engineering is a scientific and technical direction that covers the problems of analysis and synthesis of electronic devices applied in many fields of technology, primarily in electronics, radio engineering, automation, computing and other fields. It serves the purpose of ensuring the correct selection and construction of electronic devices' circuits for the optimal performance of their functions, and the resolution of issues related to the reporting and selection of these devices and the elements included in their composition.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Types of digital ISs, their conventional-graphic marking and constructive arrangement - Basic parameters and characteristics of digital microcircuits - *Classification of microprocessors*	1, 2
2	To form an understanding of the goals and objectives of the "Fundamentals of Circuit Engineering" training for undergraduate students;	1, 2
3	Performing practical tasks used in the training of the "Fundamentals of Circuit Engineering" course for undergraduate students;	1, 2
4	Monitoring and investigating the level of performance of practical tasks	1, 2
5	The role of the microprocessor in the development of technical systems: Analog-to-digital and digital-to-analog converters	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	4

3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	3
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	3
6	ability to apply design and development principles to creating software systems of varying complexity	4
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	3
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction to the basics of circuit engineering. Basic concepts. Characteristics, types and marking of digital devices	
2		LECTURE 2 Logical constants and variables. Operations of Boolean algebra. The duality principle in logical operations	
3		LECTURE 3 Methods of describing logic variables by electrical signals. Classification of basic ME	
4		LECTURE 4 Widely used basic logic chips	
5		LECTURE 5 Combinational digital devices. Typical functional diagrams of combinational digital devices	
6		LECTURE 6 Multiplexer and demultiplexer	
7		LECTURE 7 Registers. Counters	
8		LECTURE 8 Edcoder and decoder	
9		LECTURE 9 Triggers	
10		LECTURE 10 Consolidators	
11		LECTURE 11 Consolidators	

12		LECTURE 12 Comparators	
13		LECTURE 13 Comparators	
14		LECTURE 14 Microprocessors, purpose, classification and technical	
15		LECTURE 15 Microprocessors, purpose, classification and technical	

Recommended Sources

TEXTBOOK(S)

1. Peter Spasov, Microcontroller Technology, The 68HC11 and 68HC12, fifth edition, copyright 2021 by Pearson Education, Inc.
2. Thomas L. Floyd Digital Fundamentals, 11th edition, ISBN 978-0-13-273796-8, published by Pearson Education 2015.
3. Mark Balch COMPLETE DIGITAL DESIGN, A Comprehensive Guide to Digital Electronics and Computer System Architecture 2003 by The McGraw-Hill Companies.
4. Ali Özdemir Digital Electronics ISBN 978-605-324-001-3, 2016, 220 pages.
5. Volnei A. Pedroni DIGITAL ELECTRONICS AND DESIGN WITH VHDL, 2008 by Elsevier Inc. All rights reserved A.H. Mammadov Microcircuitry textbook. Baku Chasıoğlu 2002
6. F.H. Mammadov, A.H. Mammadov, M.A. Mammadov Fundamentals of Circuit Engineering Textbook Part I-II Baku 2007.
7. Gusev V.G., Gusev Yu.I. Electronics: Textbook for universities. 2-oe изд., перераб и дополн. - M.: Высшая школа, 1991г. - 622 p.
8. Voloshchenko Yu.I. Martyushov Yu.Yu. Nikitina I.N. Основы радиоэлектроники, учебное пособие - M.: Изд. MAI, 1993г. - 416s.
9. Kuzmin A.Ya. "Construirovanie и microminiaturization EBA". Textbook. Allowance for universities. M.; Radio and communication, 2005-28 p.
10. Разработка и образмение конструкторской документации PEA. Help. Allowance. Yu.T. Романычева и др., M.; Radio and communication, 2004-256 p.
11. Tietse U. Shenk K. Semi-conductor circuit breaker. с нем. - M, Mir, 1983.
12. https://www.cl.cam.ac.uk/teaching/0708/DigElec/Digital_Electronics_pdf.pdf
13. https://pages.uoregon.edu/rayfrey/DigitalNotes.pdf

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

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	System simulation
Course Unit Code	ATMF-BO5
Type of Course Unit	Elective
Level of Course Unit	3
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Gasimov Ziraddin Amirahmed
Name of Lecturer(s)	Gasimov Ziraddin Amirahmed

Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject of "Systems Simulation" studies the processes of information processing and exchange and the methods and means of their implementation. These methods and means are applied in many fields of technical sciences, including information processing processes and network technologies. In modern times, it is a global complex in the field of obtaining geographically oriented, location-specific information in solving large-scale problems (social, economic, ecological, etc.), collecting it in special repositories, using it for specific purposes, and managing it through the application of space-based overview and special query programs.

Course Objectives:

The purpose of the subject "Systems Simulation" is to form the relevant knowledge and skills in information processing processes, information transmission through communication devices, network equipment, their use in solving various software application problems, using input and output devices of personal computers. (Brief information about the subject, related subjects (directly related/compatible), objectives of teaching the subject. It is noted 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	Formation of ideas about the purpose, subject and basic concepts of the subject	1, 2
2	Introduction to the subject of “Systems Simulation”, its scientific value and modernity. To provide information about the relevance and practical essence of modern research in “Systems Simulation”	1, 2
3	"Systems Simulation" and its development history, "Communication Channels" and its relationship with other scientific fields	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5

3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	5
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Generalized circuit simulation of a communication system	
2		LECTURE 2 Simulation of signal transmission over distance	
3		LECTURE 3 Modern types and simulation of electrical communication. Simulation of uninterrupted signal transmission systems.	
4		LECTURE 4 Digital signals. basic concepts. structure and simulation of digital transmission. Signals used in digital transmission systems. their types. spectral description and parameters	
5		LECTURE 5 Signal transmission in digital transmission systems. Methods and simulation of signal processing and division in digital transmission systems.	
6		LECTURE 6 Principles of construction and simulation of fiber optic transmission systems	
7		LECTURE 7 Principles of discrete channel construction. Simulation of discrete channels with amplitude and frequency modulation	
8		LECTURE 8 Simulation of discrete channels with amplitude and frequency modulation. Discrete channels with phase and multiple modulation	

9		LECTURE 9 Simulation of optical receivers, the main nodes of optical transmission systems	
10		LECTURE 10 Number systems. Signal coding rules. Signal transmission principles and simulation of switching equipment. Switching equipment simulation. Optical amplifier simulation	
11		LECTURE 11 Signal converter devices (modems)	
12		LECTURE 12 Simulation of fiber optic transmission systems	
13		LECTURE 13 Switching methods used in digital transmission networks	
14		LECTURE 14 Circuit and data-switched digital transmission networks	
15		LECTURE 15 Packet and hybrid switched digital transmission networks. Classification of electrical communication networks	

Recommended Sources

TEXTBOOK(S)

1. "Systems Simulation" and its development history, "Communication Channels" and its relations with other scientific fields, 2007
2. Klyuev N.I. Fundamentals of information transfer theory. M., "Soviet Radio", 2009
3. Meshkovsky K.A., Kirillov N.E. Coding in technical communication. M. "Communications", 2006
4. https://www.aztu.edu.az/sub_site/web_admin/upload/files/aztu.edu.az/menus/9-2022/15-%20Sistemlerin%20Simulasiyi.pdf
5. https://www.ags-engineering.com/az/systems-simulation-modeling

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

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Distributed systems for data
Course Unit Code	ATMF-B05
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Bahar Huseynaga Askerova

Name of Lecturer(s)	Bahar Huseynaga Askerova
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, 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 given in writing. It states what students will know, what they will achieve, and what skills they will acquire by studying this subject.) “Distributed data systems” scienceprinciples of building distributed systems, concepts of hardware and software solutions for distributed systems,distributed systems technologies and models,communication methods in distributed systems,distributed databases and their architecture and operating principlesteaches.

Course Objectives:

Ensuring the scientific and methodological preparation of future specialists (the purpose and content of Distributed Data Systems training, forms of training organization, methods and tools, modern training technologies), forming in them the relevant knowledge, skills and habits for implementing training, familiarizing them with the experience gained in teaching the subject "Distributed Data Systems", and forming the ability to think logically.

Learning Outcomes

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 "Distributed Data Systems" as a science, scientific research methods, and its relationship with other sciences	1, 2
2	Formation of ideas about the forms of organizing training on "Distributed Data Systems"	1, 2
3	Formation of ideas about the means of training "Distributed Data Systems"	1, 2
4	Formation of ideas about the principles and training methods of "Distributed Data Systems" training	1, 2
5	Formation of ideas about the goals and objectives of Distributed Data Systems training for undergraduate students	1, 2
6	Completion of practical tasks used in the training of the "Distributed Data Systems" course for undergraduate students	1, 2
7	Monitoring and investigating the level of performance of practical tasks	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction to distributed systems. Definition of a distributed system.Principles of building distributed systems:communication, processes, synchronization, consistency and replication, fault tolerance, protection	
2		LECTURE 2 Database models.Distributed system issues. Distributed system issues: user access to resources, transparency, openness, scaling. Scaling issues	
3		LECTURE 3 Building a conceptual model appropriate to the subject area. Normalizing tables.Concepts of hardware solutions. Classification of distributed computing systems. Homogeneous and heterogeneous systems	
4		LECTURE 4 Homogeneous multicomputer systems. Heterogeneous multicomputer systems.Creating tables. Limitations in SQL	

5		LECTURE 5 Software solutions concepts. Distributed operating systems. Operating systems for single-processor computers. Multiprocessor operating systems. Multicomputer operating systems. Distributed shared memory systems	
6		LECTURE 6 Data management.Middle-tier software. Middle-tier models. Middle-tier services: access transparency, naming, storage, distributed transactions, security. Comparison of systems	
7		LECTURE 7 Technologies and models. Client-server technology. Clients and servers. Division of applications by levels: user interface level, processing level, data level. Client-server ttechnology models: file server model, remote data access model, database server model, application server model. Advantages and disadvantages of these models	
8		LECTURE 8 Selection operator.Communication in distributed systems. Protocol levels. Lower-level protocols. Transport protocols. Upper-level protocols	
9		LECTURE 9 Remote procedure invocation.Basic RPC operations. Accessing remote distributed objectsmanagement operators	
10		LECTURE 10 Distributed databases. Basic concepts. Centralized and distributed data processing systems. Homogeneous and heterogeneous DBs. Architecture of distributed DBs. File-server architecture. Client-server architecture	
11		LECTURE 11 Characteristics and features of distributed VBIS.Ensuring transparency in PVBIS. Characteristics of distributed commercial VBIS	
12		LECTURE 12 Distributed data storage mechanisms. Fragmentation and replication. Data distribution. Replication mechanisms. Tools for working with distributed databases.Next generation database management systems. Characteristics of ORACLE PVBIS.Object-oriented VBIS	
13		LECTURE 13 Designing complex queries.COM technology. Basic concepts and definitions. History of development of COM. Goals and issues of COM technology. Functioning of COM. Methods of implementation of COM servers	
14		LECTURE 14 Object technologies for building distributed information systems. CORBA technology.CORBA architecture	
15		LECTURE 15 Interface and implementation. "Chokers" and "supplies".CORBA network model. CORBA object model. CORBA clients and servers.Internal mechanism for transmitting requests	

Recommended Sources

TEXTBOOK(S)

1. Tanenbaum E., van Steen M. Distributed systems. Principles and paradigms. — SPb.: Peter, 2003. — 877 c.
2. Demina A.V., Aleksentseva O.N. Distributed systems: textbook for students. Saratov, 2018. – 108 p.
3. Vostokin S. B. Architecture of modern distributed systems [Electronic resource]. Complex. Samara, 2013. – 91 p.
4. Mamedli R.E. Database management systems: Tutorial. – Nizhnevartovsk: Publication of Nizhnevartovskogo state university, 2021. – 214 c.
5. Samir Samadov, Ramin Samadov. SQL easy approach. Baku: European Publishing House, 2013, 224 p.
6. N.D.Cafarov, N.A.Rahimova Modern programming technology. (Part II). Baku: ASNA Printing House. 2011. 368 p.
7. Data Structures Succinctly Part 2 by Robert Horvick, 2017.
8. Sams Teach Yourself SQL in 10 Minutes, Fourth Edition, 2014.
9. Pirogov V. Yu. Information systems and data bases: organization and design: учеб. allowance. — СПб: БХВ-Петербург, 2009. — 528 с.
10. Burakov P.V., Petrov V.Yu. Introduction to database systems. Study guide. -2012. - 128 p.
11. Agaltsov V.P. Database. В 2-х kn. Book 2. Distributed and remote data bases. M.: ИД «ФОРУМ»: ИНФРА-М, 2017. — 271 с
12. Kosyakov M.S. Introduction to distributed computing. – SPb NIU ITMO, 2014. 155 p.
13. Toporkov V.V. Models of distributed computing. M.: Fizmatlit, 2004. –320 c.
14. Tsymbal A.A., Anshina M. Technologies for creating distributed systems. St. Petersburg: Peter, 2012.
15. Fufaev E.V, Fufaev D.E. Development and exploitation of remote data bases. Moscow: Academy, 2012.
16. Morgan S. Development of distributed applications on the platform Microsoft .Net Framework. – M.: Russkaya Redaktsia; СПб.: Peter, 2008. – 608 c.
17. Radchenko, G.I. Distributed computing systems: textbook. – Chelyabinsk: Фотохудожник, 2012. – 184 c. – Access mode:http://window.edu.ru/resource/646/76646
18. Maharramov ZT, Abdullayev VH Databases (intervention with ADO technology). Baku, “Elm”, 2019. – 228 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	
Total Workload	**150**
Total Workload/30(h)	**150/30**
ECTS Credits of the Course	**5**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Robotics
Course Unit Code	ATMF-B06
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	3

Semester when the course unit is delivered	5
Course Coordinator	Remizov Mikhail Yurievich
Name of Lecturer(s)	Remizov Mikhail Yurievich
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	English, Azerbaijani
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Theory of Robotics is one of the main courses that forms the basis of modern education. Roboticists develop man-made mechanical devices that can move by themselves, whose motion must be modeled, planned, sensed, actuated and controlled, and whose motion behavior can be influenced by "programming". Robots are called "intelligent" if they succeed in moving in safe interaction with an unstructured environment, while autonomously achieving their specified tasks. Within the framework of this course, it is planned to consider the definition that implies a device called a "robot" if it contains a movable mechanism, influenced by sensing, planning, actuation and control components. It does not imply that a minimum number of these components must be implemented in software, or be changeable by the "consumer" who uses the device; for example, the motion behavior can have been hard-wired into the device by the manufacturer.

Course Objectives:

- To study the theoretical foundations of Robotics, methods of research and solution of the Robotics theoretical problems;
- To develop a culture of thinking, the ability to demonstrate basic knowledge, to acquire new scientific and professional knowledge in the Robotics theory problems.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	The basic provisions and laws of the Robotics theory problems	1, 2
2	Basic concepts, methods of the Robotics theory	1, 2
3	Methods of constructing models of real processes by methods of the Robotics theory	1, 2
4	The fundamental foundations of the Robotics theory that will be used in professional activities	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL

1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	
4	ability to use modern tools and methodologies in computing practice	
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	
6	ability to apply design and development principles to creating software systems of varying complexity	
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 What is mechatronics? Mechatronics as a system approach to the design, development and implementation of complex engineering systems	
2		LECTURE 2 Robotics. Robot programming	
3		LECTURE 3 Robotics. Robot programming	
4		LECTURE 4 The design of human-machine interface module	
5		LECTURE 5 The design of human-machine interface module	
6		LECTURE 6 Integration of risk management into the machinery design process	
7		LECTURE 7 Integration of risk management into the machinery design process	
8		LECTURE 8 Mechatronics and Robotics solutions	

9		LECTURE 9 Mechatronics and Robotics solutions	
10		LECTURE 10 Future of Mechatronics and Robotics	
11		LECTURE 11 Future of Mechatronics and Robotics	
12		LECTURE 12 Manufacturing applications of automation and robotics	
13		LECTURE 13 Manufacturing applications of automation and robotics	
14		LECTURE 14 Mechatronics and Robotics engineer career overview	
15		LECTURE 15 Mechatronics and Robotics engineer career overview	

Recommended Sources

TEXTBOOK(S)

1. Alciatore, D.G. Introduction to Mechatronics and Measurement Systems / DG Alciatore, MB Histand // Fourth Edition. – New York : McGraw-Hill, 2011.
2. Mechatronics. Recent Technological and Scientific Advances // Ryszard Jablonski and Tomaš Brezina (Eds.). – Berlin : Springer-Verlag Berlin Heidelberg, 2011.70
3. Bradley, D. Mechatronics in Action. Case Studies in Mechatronics – Application and Education /D. Bradley, D.W. Russell. – London : Springer-Verlag London Limited, 2010.
4. Smaili, A. Applied Mechatronics / A. Smaili, F. Mrad. – Oxford: Oxford University Press, 2008.
5. Melnikova, L.A. Teaching reading literature in English in the specialty "Robotized installations" [Electronic resource]: textbook.-method. manual / LA Melnikova. - M.: Publishing house of Bauman Moscow State Technical University, 2007. - 37 p.
6. Rudnitsky, V.A. Mechatronics: textbook. manual for practical work in prof. English language / V.A. Rudnitsky, A.V. Stepanova; Tomsk Polytechnic University - Tomsk: Publishing house of Tomsk Polytechnic University, 2001. - 174 p.
7. Nikitina, S.Ya. English language: textbook.-method. manual for 2nd – 3rd year students of the specialty "Mechatronics" / S. Ya. Nikitina, DK Tyumikov. – Samara: SamGUPS, 2009. – 200 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	
Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Electrical Engineering
Course Unit Code	ATMF-B06
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Rustamova Durdana Farhad

Name of Lecturer(s)	Rustamova Durdana Farhad
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject "Electrical Engineering" provides basic information about the basic laws of electrical engineering, methods of analyzing electrical circuits, basic concepts of electric and magnetic circuits, and the operating principles, properties, parameters, and characteristics of devices.

Course Objectives:

The goal and main objective of teaching the subject is to provide future specialists with relevant knowledge about "Electrical Engineering" and to develop in them the ability to effectively use this knowledge in their work. The knowledge acquired will be significantly useful for these specialists in monitoring, maintaining, and improving the operation of electronic circuits.

Learning Outcomes

At the end of the course the student will be able to know		Assessment
1	Electrical power sources; Electrical measuring devices	1, 2
2	Basic laws of electric circuits; Ideal electric circuit with R, L and C elements;	1, 2
3	Structure and working principle of transformers; DC machines	1, 2
4	Asynchronous machines; Synchronous machines	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	4
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4

6	ability to apply design and development principles to creating software systems of varying complexity	4
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	4
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Historical development of electrical engineering. Basic concepts of electrical engineering science	
2		LECTURE 2 Basic quantities characterizing electromagnetic processes in electrical circuits	
3		LECTURE 3 Electrical power sources. Electrical measuring devices	
4		LECTURE 4 Basic laws of electrical circuits. Ohm's law for a circuit part and a complete circuit. Power balance. Kirchhoff's laws	
5		LECTURE 5 Operating modes of an electrical circuit. Formal forms of resistance combinations	
6		LECTURE 6 An ideal electric circuit with R, L and C elements	
7		LECTURE 7 Voltage resonance. Power triangle	
8		LECTURE 8 Single-phase alternating current circuits	
9		LECTURE 9 Three-phase alternating current circuits	
10		LECTURE 10 Transformers. Structure, working principle of transformers	
11		LECTURE 11 Types of transformers. Three-phase transformers	
12		LECTURE 12 Current measuring transformers. Voltage measuring transformers	
13		LECTURE 13 DC machines	
14		LECTURE 14 Asynchronous machines	

15		LECTURE 15 Synchronous machines	

Recommended Sources

TEXTBOOK(S)

1. Abdullayev N.D., Ismayilov K.G., Abdulgadirov A.I. “Testing and reliability of electric machines” Baku-1990
2. Abdullayev Y.R. “Electrical and electronic devices” Baku, Military Publishing House, 1999 (Part I)
3. Abdullayev Y.R. “Electrical and electronic devices” Baku, Military Publishing House, 1999 (Part II)
4. Osmanov S.C., Gasimova T.C. “Electrical machines” (Part I) Baku-2007
5. Osmanov S.C., “Electrical machines” (Part II) Baku-2010
6. Abdulrahmanov Q.A., “Electrical and electronic devices” Baku-2006, “Education” NPM

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

Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Embedded Systems
Course Unit Code	ATMF-B06
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Bahar Huseynaga Askerova
Name of Lecturer(s)	Bahar Huseynaga Askerova
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
To impart the general characteristics, concepts, importance, areas of use of decision-making systems, the architecture, working principles and components of decision-making systems, and the practical knowledge and principles for their creation.teaches.

Course Objectives:

Ensuring the scientific and methodological preparation of future specialists (goals and content of Decision-Making Systems training, forms of training organization, methods and tools, modern training technologies), forming in them the relevant knowledge, skills and habits for implementing training, familiarizing them with the experience gained in teaching the subject "Decision-Making Systems", and forming the ability to think logically.

Learning Outcomes		
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 "Decision-making systems" as a science, scientific research methods, and its relationship with other sciences. Formation of ideas about the forms of organizing the training "Decision-making systems".	1, 2
2	Formation of ideas about the tools of “Decision-making systems” training. Formation of ideas about the principles and training methods of “Decision-making systems” training. Formation of ideas about the goals and objectives of Decision-making systems training for undergraduate students.	1, 2
3	Performing practical tasks used in the training of the "Decision-Making Systems" course for undergraduate students. Monitoring and investigating the level of performance of practical tasks.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	5
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	5
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Course Contents			
Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction to the basics of decision making. Subject matter. Basic concepts. Classification of management decisions	
2		LECTURE 2 Principles and methods of the decision-making process. Decision-making process. Basic principles and stages of the decision-making process. Methods of decision-making	
3		LECTURE 3 Decision-making models in management. Basic models of management decision-making and forms of implementation	
4		LECTURE 4 Fundamentals of building decision-making systems.Basic concepts. History of the emergence and development of decision support systems	
5		LECTURE 5 Architecture of decision-making systems. Decision-making systems based on a two-level data warehouse. Decision-making systems based on a three-level data warehouse. Stages of building decision-making systems	
6		LECTURE 6 Database-based QQDS. Basic features of a database. Differences between a database and a data warehouse	
7		LECTURE 7 Problems arising in analytical processing of data in Decision-Making Systems based on databases	
8		LECTURE 8 Decision-Making Systems Based on Data Warehouse	
9		LECTURE 9 Data warehouse concept. Organization of work processes in Decision-Making systems based on data warehouse	
10		LECTURE 10 Data operations. Data extraction, transformation and loading into the warehouse. Methods of organizing the ETL process. ETL process development	
11		LECTURE 11 Decision-making systemsData analysis in VA. Data analytics email in VA. Classification and regression problems	
12		LECTURE 12 Detection of anomalies and deviations from general patterns. Forecasting. Visualization	
13		LECTURE 13 Areas of application of the QGS. Business. Telecommunications and Internet. Technologies. Banking. Insurance business	
14		LECTURE 14 Methods and tools for data analysis. Stages of intellectual analysis. Fuzzy logic.Neural networks. Genetic	

		algorithms	
15		LECTURE 15 COM, OLE and ActiveX technologies. Implementation of COM, OLE and ActiveX technologies in the POLYANALYST system	
16		LECTURE 16 Introduction to the basics of decision making Introduction. Subject of the subject. Basic concepts. Classification of management decisions	

Recommended Sources

TEXTBOOK(S)

1. Prokhorov Yu.K., Frolov V.V. Management decisions. С.Пт – 2017
2. Basics of making a management decision. http://psyera.ru/Osnovy–prinyatiya –upravlencheskogo–resheniya–353.htm
3. Sergey Korneev. Decision support systems in business http://www.sib.com.ua/archiv – 2005/6 – 2005/systems/systems.htm
4. Lecture; A comprehensive approach to implementing Data Mining, OLAR and data storage in SPPR http://www.intuit.ru/department/database/datamining/17/datamining–17.html
5. Brief history of the development of system support for the adoption of decisions http://corportal.ru/History/DataTech/DSS/DSS.aspx
6. Karimov S.Q. Information systems. -Baku: Elm, 2008
7. Karimov S.Q. Management information technologies and corporate information systems. Textbook – Baku: ADNA, 2010
8. Kopneev V.V., Gareev A.F., Vasyutin S.V., Raikh V.V. Basic data. Intelligent information processing. M: Haludzh, 2018. Kosyakov M.S. Introduction to distributed computing. – SPb NIU ITMO, 2020. 155 c.
9. Toporkov V.V. Models of distributed computing. M.: Fizmatlit, 2004. –320 c.
10. Tsymbal A.A., Anshina M. Technologies for creating distributed systems. St. Petersburg: Peter, 2012.
11. Fufaev E.V, Fufaev D.E. Development and exploitation of remote data bases. Moscow: Academy, 2012.
12. Morgan S. Development of distributed applications on the platform Microsoft .Net Framework. – M.: Russkaya Redaktsia; СПб.: Peter, 2008. – 608 c.
13. Radchenko, G.I. Distributed computing systems: textbook. – Chelyabinsk: Фотохудожник, 2012. – 184 c. – Access mode:http://window.edu.ru/resource/646/76646
14. Maharramov Z.T., Abdullayev VH Databases (intervention with ADO technology). Baku, “Elm”, 2019. – 228 p.
15. Karimov S.Q., Karimova G.S. Organization and modeling of the ETL process in a data warehouse //News of ANAS, volume XXXI – Problems of Informatics and Management, No. 6, 2011, pp. 20-26

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

Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Cybersecurity
Course Unit Code	ATMF-B07
Type of Course Unit	Elective
Level of Course Unit	3
National Credits	

Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Parvin Huseynov Adil
Name of Lecturer(s)	Parvin Huseynov Adil
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

To provide students with basic conceptual and practical knowledge in the field of modern cyber threats, attack types, defense technologies, and information security.

Course Objectives:

This course teaches students the principles of cybersecurity, cryptography, network security, system vulnerabilities and their exploitation, and the analysis of real-world security incidents. The course includes both theoretical and practical exercises.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Will be able to explain the basic concepts of cybersecurity;	1, 2
2	Be able to identify network and system vulnerabilities and apply methods to prevent them	1, 2
3	Will understand and be able to use cryptographic methods	1, 2
4	Be able to analyze offensive and defensive strategies	1, 2
5	Be able to respond to and report on security incidents	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL

1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	5
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	5
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction to cybersecurity	
2		LECTURE 2 Information security basics	
3		LECTURE 3 Network security and firewalls	
4		LECTURE 4 Cryptography: basic concepts	
5		LECTURE 5 Symmetric and asymmetric encryption	
6		LECTURE 6 Digital signature, SSL/TLS	
7		LECTURE 7 Vulnerabilities and exploitation methods	
8		LECTURE 8 Types of attacks (DoS, MITM, SQLi, etc.)	
9		LECTURE 9 Antivirus and anti-malware systems	

10		LECTURE 10 Ethical hacking and penetration testing	
11		LECTURE 11 Security policies and regulations	
12		LECTURE 12 Hazard models and risk analysis	
13		LECTURE 13 Security Event Management (SIEM)	
14		LECTURE 14 Mobile and cloud security	
15		LECTURE 15 General recaps and project presentations	

Recommended Sources

TEXTBOOK(S)

1. William Stallings – Network Security Essentials
2. Michael T. Goodrich, Roberto Tamassia – Introduction to Computer Security
3. Mark Stamp – Information Security: Principles and Practice Bruce Schneier – Applied Cryptography
4. Ross Anderson – Security Engineering
5. Richard Bejtlich – The Practice of Network Security Monitoring

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	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Information Security in Mobile Phones
Course Unit Code	ATMF-B07
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Rajabli Sevinj Shirazi
Name of Lecturer(s)	Rajabli Sevinj Shirazi
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The aim of the course is to explain the basic principles and concepts of cybersecurity on mobile devices. Learn about types of cyberattacks and defense strategies targeting mobile systems and devices
To master the basics of network and system security when connecting to the internet on mobile devices and in the process of exchanging information.Implementing social engineering methods and protection measures against mobile devices.

Course Objectives:

This course aims to teach the basic concepts of information security and cybersecurity in mobile phones, the principles of information security, and attack and defense methods. Students should analyze cyberattacks targeting mobile phones, understand cybersecurity risks, and develop skills in managing them. The course covers both theoretical and practical approaches.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	will understand the importance of information security on mobile phones, gain knowledge of cybersecurity principles and basic concepts, and will also be able to apply security measures for networks and systems, mobile applications, and social networking platforms on mobile phones, and analyze attack methods and their prevention.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	4
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	5

9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Login and mobile phone information security	
2		LECTURE 2 Mobile device architecture and security policies	
3		LECTURE 3 Data encryption and decryption technology	
4		LECTURE 4 Network security on mobile devices	
5		LECTURE 5 Malware on mobile devices	
6		LECTURE 6 Mobile application security	
7		LECTURE 7 Protection of personal data	
8		LECTURE 8 Security tool and monitoring tools	
9		LECTURE 9 Phishing and social engineering attacks on mobile phones	
10		LECTURE 10 Security policies and procedures on mobile phones	
11		LECTURE 11 Mobile cloud technologies and security	
12		LECTURE 12 Biometric security of mobile devices	
13		LECTURE 13 Security of mobile payment systems	
14		LECTURE 14 Security infrastructures and VPN	
15		LECTURE 15 Future threats and trends	

Recommended Sources

TEXTBOOK(S)

1. Furkan Enes Polatoglu - security of systems
2. Mobi Stephen Fried - Mobile Device Security: A Comprehensive Guide to Securing Your Information in a Moving World l
3. https://www.btkakademi.gov.tr/portal/course/mobil-guvenlik-ve-sizma-teknikleri-9355

4. https://www.youtube.com/watch?v=AXHTVTDj-R8&ab_channel=GoldphishCybersecurityAwarenessTraining

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	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Sciencebachelor program, Department of "Programming and Information Security"

Course Unit Title	Methods of Ensuring Cybersecurity
Course Unit Code	ATMF-B07

Type of Course Unit	Elective
Level of Course Unit	3
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Rajabli Sevinj Shirazi
Name of Lecturer(s)	Rajabli Sevinj Shirazi
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The main goal of this subject is to provide students with fundamental knowledge and practical skills in the field of cybersecurity, and to teach modern methods and technologies for ensuring information security in organizations.

Course Objectives:

The main goal of this subject is to provide students with fundamental knowledge and practical skills in the field of cybersecurity, and to teach modern methods and technologies for ensuring information security in organizations.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Understand the basic principles and terminology of cybersecurity	1, 2
2	Know the different types of cyberattacks and how to prevent them	1, 2
3	Be able to apply technologies and approaches to ensure information security in organizations	1, 2

4	Will gain skills in risk assessment and incident management	1, 2
5	Learn how to manage cybersecurity and develop policies	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	5
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	5
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 The importance and essence of information security, security principles	
2		LECTURE 2 Introduction to cybersecurity, types and nature of security controls	
3		LECTURE 3 Threats, dangers, attacks and vulnerabilities in cybersecurity	

4		LECTURE 4 The essence of security architecture	
5		LECTURE 5 The essence of security architecture	
6		LECTURE 6 Methods and techniques used to ensure cybersecurity	
7		LECTURE 7 Methods and techniques used to ensure cybersecurity	
8		LECTURE 8 Incident detection and response	
9		LECTURE 9 Incident detection and response	
10		LECTURE 10 Compliance and legislative requirements in cybersecurity	
11		LECTURE 11 Compliance and legislative requirements in cybersecurity	
12		LECTURE 12 The importance of cybersecurity education, the role of international certifications, and areas of work	
13		LECTURE 13 The importance of cybersecurity education, the role of international certifications, and areas of work	
14		LECTURE 14 The importance and essence of information security, security principles	
15		LECTURE 15 The importance and essence of information security, security principles	

Recommended Sources

TEXTBOOK(S)

1. Phd. Gunay Abdiyeva-Aliyeva - “Fundamentals of Cybersecurity”
2. Phd. Gunay Abdiyeva-Aliyeva, Sevinj Rajabli - “Computer Forensics”
3. William Stallings – "Network Security Essentials: Applications and Standards

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	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Data Structures and Algorithms
Course Unit Code	ATMF-B08
Type of Course Unit	Elective
Level of Course Unit	3
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3

Semester when the course unit is delivered	6
Course Coordinator	Bagirova Vafa Vagif
Name of Lecturer(s)	Bagirova Vafa Vagif
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

This course covers the analysis and analysis of data through the application of artificial intelligence (AI) and machine learning (ML) technologies, methodologies, and algorithms. The course provides students with a comprehensive knowledge of many concepts of data science and machine learning skills.

Course Objectives:

The main goal of this subject is to develop the skills of future professionals to work directly with artificial intelligence and innovation technologies, and to teach fundamental data science and machine learning knowledge and skills.

Learning Outcomes

At the end of the course the student will be able to know		Assessment
1	Data Mining	1, 2
2	Predicting future values as a result of data analysis	1, 2
3	Becoming a data analytics expert	1, 2
4	Acquire basic and intermediate knowledge in data science	1, 2
5	Developing Practical Skills	1, 2
6	Introduction to Modern Technologies	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5

3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction to Data Science	
2		LECTURE 2 Data preparation, identification and elimination of outliers	
3		LECTURE 3 General analysis of key statistical indicators and information	
4		LECTURE 4 Data visualization: basic graphs and lines	
5		LECTURE 5 Data visualization:Tableau	
6		LECTURE 6 Creating interactive dashboards	
7		LECTURE 7 Machine learning - basic knowledge	
8		LECTURE 8 Types of Supervised Machine Learning	
9		LECTURE 9 Supervised Machine Learning: linear regression, logistic regression	
10		LECTURE 10 Supervised Machine Learning: support vector machines (SVM), KNN	
11		LECTURE 11 Supervised/Unsupervised Machine Learning - Decision Trees	

12		LECTURE 12 Supervised Machine Learning algorithms	
13		LECTURE 13 Data Analysis – Introduction to SPSS	
14		LECTURE 14 Descriptive Statistics	
15		LECTURE 15 Correlation and ANOVA analysis	

Recommended Sources

TEXTBOOK(S)

1. Bishop, CM (2006). Pattern recognition and machine learning. Springer.
2. An Introduction to Statistical Learning: With Applications in R
3. James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). An introduction to statistical learning: With applications in R. Springe

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

Total Workload	**180**
Total Workload/30(h)	**180/30**

ECTS Credits of the Course	**6**

Computer Sciencebachelor program, Department of "Programming and Information Security"

Course Unit Title	Web Programming
Course Unit Code	ATMF-BO8
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Mammadli Gunel Mirza
Name of Lecturer(s)	Mammadli Gunel Mirza
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The web programming course covers the steps taken on the front-user and back-server sides and familiarization with relevant technologies for developing web applications (writing programs for the operation of dynamic sites on the World Wide Web), and is intended to teach students important concepts and increase their basic knowledge. It includes sections on the description, explanation of modern concepts used in the web and web programming, and their application and use in modern times.

Course Objectives:

The web programming course covers modern web standards for developing interactive websites, technologies used to achieve the set goal on the server and user side. Students are provided with the formation of relevant knowledge, skills and habits, and they master the capabilities of technical tools and software needed to develop dynamic websites.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	The main purpose and capabilities of the web, internet, and web programming;	1, 2
2	Formation of ideas about web programming training tools	1, 2
3	Formation of ideas about the principles and training methods of web programming training;	1, 2
4	To form an understanding of the goals and objectives of Web programming training for undergraduate students;	1, 2
5	Performing practical tasks used in the training of Web programming course for undergraduate students; Monitoring and investigating the level of implementation of practical tasks;	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	4
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5

7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Course Contents

Week	Chapter	Topics	Exam
1		Lesson 1. Web technologies, programming languages. Browser	
2		Lesson 2. HTML standards. HTML structure, element families. Static web pages SEMINAR 1	
3		Lesson 3. Block, line type tags. Table	
4		Lesson 4. Headings, hyperlinks, text formatting elements SEMINAR 2	
5		Lesson 5. Forms and their elements. Transferring data using forms	
6		Lesson 6. CSS. Selectors SEMINAR 3	
7		Lesson 7. CSS rules. Inline, block, inline-block elements	
8		Lesson 8. Units of measurement, colors in CSS SEMINAR 4	
9		Lesson 9. The concept of edge, distance from the edge, and frame	
10		Lesson 10. Elements positioning properties in CSS, z-index SEMINAR 5	
11		Lesson 11. Pseudo classes	
12		Lesson 12. HTML coding styles. Fixed, “rubber”, adaptive coding SEMINAR 6	
13		Lesson 13. Javascript. Login and connection rules	
14		Lesson 14. Javascript. Variables, operators and period operators SEMINAR 7	

15		Lesson 15. Javascript. Conditional operator and functions	

Recommended Sources

TEXTBOOK(S)

1. Ben Henick. HTML and CSS. Path to perfection. 2011. Peter.
2. John Duckett. HTML & CSS Design and Build websites. John Wiley & Sons, Inc.

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

Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Problems in Mathematical Logic
Course Unit Code	ATMF-B09
Type of Course Unit	Elective
Level of Course Unit	4th year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Farajova Sona Samir
Name of Lecturer(s)	Farajova Sona Samir
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject of mathematical logic problems is the analysis of information given in numerical, graphical and tabular form and the detection of regularities, the calculation of various indicators based on the given information, the generalization of information given in numerical, graphical and tabular form, the analysis of the mathematical formulation of the problem, the assessment of the sufficiency of data in arithmetic, algebra and geometry problems.

Course Objectives:

Course objectivein studentsmathematical logical thinking is to ensure the formation of students' thinking style. Here Includes analysis of information presented in numerical, graphical and tabular form and detection of regularities, assessment of the sufficiency of data in arithmetic, algebra and geometry problems, methods for solving anagrams and verbal tests.

Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	Mathematical logical thinking is a powerful tool for shaping students' thinking patterns.	1, 2
2	Analysis of conditions and selection of conditions necessary for solving the problem	1, 2
3	Analysis of information presented in numerical, graphical and tabular form and detection of patterns	1, 2
4	Calculation of various indicators based on the information provided	1, 2
5	Summarizing information presented in numerical, graphical, and tabular form	1, 2
6	Analysis of the mathematical formulation of the problem	1, 2
7	Understanding the content of mathematical problems and questions	1, 2
8	Evaluating the adequacy of data in arithmetic, algebra, and geometry problems	1, 2
9	Determining whether the information in the terms and conditions is sufficient to resolve the issue	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	5
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	3
6	ability to apply design and development principles to creating software systems of varying complexity	4
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	3

10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Passwords. Sequences of numbers. Obvious and non-obvious operators	
2		LECTURE 2 Choosing a word(s) based on analogy	
3		LECTURE 3 Finding an incomplete pair based on a given logical relationship.Logical analysis of the text	
4		LECTURE 4 Building various combinations of figures	
5		LECTURE 5 Choosing a picture by analogy. Rules for distinguishing analogous pictures	
6		LECTURE 6 Classification and solutions of picture tests	
7		LECTURE 7 The imaginary joining or separation of parts of a figure. Unfolding a folded sheet with cuts	
8		LECTURE 8 Rotating, unfolding, and folding the figure	
9		LECTURE 9 Picture - number relationships.Methods for solving tests given in tabular form	
10		LECTURE 10 QMethods for solving tests given in graphic form	
11		LECTURE 11 Scales. Solving tests related to mathematical regularity	
12		LECTURE 12 Solving logical-mathematical problems	
13		LECTURE 13 Tests involving mathematical operations. Geometric logic	
14		LECTURE 14 Solving verbal tests	
15		LECTURE 15 Sapyor. Solution of modular test groups	

Recommended Sources

TEXTBOOK(S)

1. Ismayilov FS, Hasanov I. R. “IQ test samples for the development of logical thinking” Part I. Baku-2010
2. Ismayilov FS, Hasanov I. R. “IQ test samples for the development of logical thinking” Part II. Baku-2010
3. Puza Publications, IQ Question Bank 2018
4. Metropol Publications, IQ Question Bank 1, 2 and 3, 2019.

5. Asadov R. “Tests for testing logical thinking”. Baku-2021.		
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		
Total Workload		**180**
Total Workload/30(h)		**180/30**
ECTS Credits of the Course		**6**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Laser and Its Application
Course Unit Code	ATMF-BO9

Type of Course Unit	Elective
Level of Course Unit	4
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Elnara Firdus
Name of Lecturer(s)	Elnara Firdus
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject "Laser and its Use" is dedicated to the study of lasers, laser radiation, its properties and creation, types, operating principles and areas of laser application, holography and holographic discs, database creation and transfer to holographic discs.

Course Objectives:

The main goal of teaching the subject "Laser and its Use" is to instill in future device engineers the ability to convey to students in detail the laser, laser radiation, their properties and creation, types, operating principle and areas of application, and to effectively use the knowledge they acquire during the course.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	The goal in teaching the subject is to achieve the main goal set during the course, to complete the intended tasks at a high level, to train educated and skilled specialists, and to educate a patriotic young generation.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program		
		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	4
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	3
6	ability to apply design and development principles to creating software systems of varying complexity	4
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	3
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction, brief history of the creation of the laser. Radiation. Spontaneous and stimulated emission. Absorption. Absorption coefficient.	
2		LECTURE 2 Laser physics. Laser device. Optical quantum generator. Properties of laser radiation. Monochromaticity. Coherence. Focusing. Temperature	
3		LECTURE 3 Optical resonators, types, structure. Active and passive resonator. Laser resonators according to the radii of curvature of mirrors.	
4		LECTURE 4 Types of laser.Solid-state lasers. Gas discharge, gas dynamic and chemical gas lasers	

5		LECTURE 5 Molecular lasers.Semiconductor lasers, structure	
6		LECTURE 6 Working principle of a laser. Active medium and exciter.Quantum amplifier.	
7		LECTURE 7 Laser communication. Military lasers. Lasers in the entertainment industry. Lasers in transportation. Laser gadgets. Laser applications in sports	
8		LECTURE 8 Holography, history of creation. Physical principles. Leyte's transfer scheme. Denisuk-Patnieksinrelocation scheme.	
9		LECTURE 9 Holographic photomaterials. Practical areas of use	
10		LECTURE 10 Holographic database. Storing the database in memory	
11		LECTURE 11 Holographic discs. Writing and reading information on discs	
12		LECTURE 12 Mathematical model.Tensors.Elements of tensor calculus	
13		LECTURE 13 Building a mathematical model of disks	
14		LECTURE 14 Development of a mathematical model of writing and reading information on disks	
15		LECTURE 15 Laser radiation. Danger to the body. Negative effects of laser rays on the human body. Protection from laser rays	

Recommended Sources

TEXTBOOK(S)

1. R.C. Gasimova, R.A. Karamaliyev, Fundamentals of Quantum Electronics, Baku University Publishing House 1991
2. N.V. Turchina, L.I. Rudakova, O.I. Surov, G.G. Spirin, T.A. Yushchenko, "Physics", Moscow, Издательский Дом Дрофа-2000, 671 с.
3. I.V. Saveliev, «Course of General Physics. Waves and Optics». Книга 4. Минск-2001, 256 с.
4. Korolenko P.V. Methods of computer optics. Laboratory of coherent optics of the physical faculty of Moscow State University (1997). Access date: August 18, 2019.
5. Leit E., Upatnieks Yu. ФОТОГРАФИРОВАНИЕ С ПОМОЩЮЮ ЛАЗЕР // Успехи физизиких наук.-1965.-Вып. 11.-С. 521-538. Access date: May 7, 2007.
6. L.V. Tarasov, "Fourteen Lectures on Lasers", Moscow

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	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Computer Mathematics
Course Unit Code	ATMF-B09
Type of Course Unit	Elective
Level of Course Unit	4
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hours/week)	2
Practice (hours/week)	2
Laboratory (hours/week)	

Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Narmin Azizli Adil
Name of Lecturer(s)	Narmin Azizli Adil
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	English, Azerbaijani
Prerequisites	-
Recommended Optional Program Components	-

Course description:

This course provides a foundational understanding of mathematical concepts essential for solving computational problems. It introduces students to the principles of logic, number systems, algebra, discrete structures, algorithmic thinking, and numerical methods — all framed within the context of computer applications. Students will learn how to represent and manipulate data mathematically, solve systems of equations, design efficient algorithms, and apply error analysis in numerical computations. The course emphasizes the role of mathematics as a tool for modeling, analyzing, and optimizing processes in computer science, engineering, and information technologies.

Course Objectives:

1. Introduce fundamental mathematical concepts used in computer science and engineering.
2. Develop skills in logic, number systems, and data representation.
3. Teach matrix operations and solving linear systems.
4. Explore discrete mathematics topics such as sets, graphs, and combinatorics.
5. Strengthen algorithmic thinking and complexity analysis.
6. Apply numerical methods and understand computational errors.
7. Enable students to model real-world problems mathematically.

Improve clear communication of mathematical solutions and ideas.

Learning Outcomes

At the end of the course the student will be able to know		Assessment
1	Perform conversions between different number systems	1, 2
2	Solve linear systems using matrix methods	1, 2
3	Analyze algorithms based on time and space complexity	1, 2
4	Implement basic numerical methods for integration and error estimation	1, 2
5	Model and solve problems using discrete mathematical structures	1, 2

6	Recognize the importance of mathematical rigor in computer science applications	1, 2
7	Apply mathematical logic to computational problems	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction and basic concepts of Computer Mathematics	
2		LECTURE 2 Fundamentals of mathematical logic. Propositional logic operations. Simplification of logical expressions	
3		LECTURE 3 Introduction to Boolean Algebra. Applications	
4		LECTURE 4 Number systems. Conversion between number systems	

5		LECTURE 5 Character Encoding. Numerical codes and error detection	
6		LECTURE 6 Numerical computation methods. Representation of numbers in computers. Fixed-point and floating-point number systems	
7		LECTURE 7 Analysis of rounding and computational errors. IEEE 754 standard	
8		LECTURE 8 Introduction to linear algebra. Matrix operations. Determinants and inverse matrices	
9		LECTURE 9 Solving systems of linear equations. Applications	
10		LECTURE 10 Sets and set operations. Introduction to Graph theory. Sequences and recursive definitions	
11		LECTURE 11 Fundamentals of combinatorics. Applications	
12		LECTURE 12 Definition of an Algorithm. Examples of Algorithms	
13		LECTURE 13 Algorithm analysis. Optimization techniques	
14		LECTURE 14 Numerical integration and differentiation. Numerical methods	
15		LECTURE 15 Approximate solutions of differential equations. Applications	

Recommended Sources

TEXTBOOK(S)

1. Discrete Mathematics and Its Applications” — Kenneth Rosen
2. "Numerical Analysis" — Richard L. Burden, J. Douglas Faires
3. "Introduction to Algorithms" — Cormen, Leiserson, Rivest, Stein
4. "Computer Arithmetic: Algorithms and Hardware Designs" — Behrooz Parhami

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	
Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credits of the Course	**6**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Digital Systems
Course Unit Code	ATMF-B10
Type of Course Unit	Elective
Level of Course Unit	4th year
National Credits	
Number of ECTS Credits Allocated	7
Theoretical (hours/week)	3
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	4

Semester when the course unit is delivered	7
Course Coordinator	Sema Bayramova Gadir
Name of Lecturer(s)	Sema Bayramova Gadir
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Digital systems"The purpose of the subject is —It is a scientific and technical direction that primarily covers the problems of analysis and synthesis of electronic devices applied in electronics, radio engineering, automation, computing technology and other fields. It serves the purpose of ensuring the correct selection and construction of electronic devices' circuits for optimal performance of the functions provided by them, and the resolution of issues related to the reporting and selection of these devices and the elements included in their composition.

Course Objectives:

- formation of ideas about research methods and their relationship with other sciences;
- For students studying at the bachelor's level, "Digital systems"Formation of ideas about the goals and objectives of training;

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Types of digital ISs, their conventional-graphic marking and constructive arrangement: -Numbermain parameters and characteristics of microcircuits - Classification of microprocessors - The role of the microprocessor in the development of technical systems -Analog-to-digital and digital-to-analog converters	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5

3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	4
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	4
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	3

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 About digital information and number systems	
2		LECTURE 2 Logic elements and their schematics. Basic parameters of logic integrated circuits	
3		LECTURE 3 Raqem electron groups	
4		LECTURE 4 Combination number devices	
5		LECTURE 5 Multiplexer, demultiplexer	
6		LECTURE 6 Encryptor, decryptor	
7		LECTURE 7 Arithmetic – Logic Devices - Adder, Comparator	
8		LECTURE 8 Sequential digit devices, TriggerFunctional diagram of the device	
9		LECTURE 9 Registers	
10		LECTURE 10 Pulse Counters	
11		LECTURE 11 AND, OR, NOT devices	
12		LECTURE 12 NAND, NOR devices	

13		LECTURE 13 Semiconductor memory devices	
14		LECTURE 14 RAM devices	
15		LECTURE 15 Permanent memory devices	

Recommended Sources

TEXTBOOK(S)

1. IEEE Std (Reaffirmed 2021), Graphic Symbols for Electrical and Electronic Diagrams.
2. Peter Spasov, Microcontroller Technology, The 68HC11 and 68HC12, fifth edition, copyright 2021 by Pearson Education, Inc.
3. Thomas L. Floyd Digital Fundamentals, 11th edition, ISBN 978-0-13-273796-8, publishedby Pearson Education 2015.
4. Mark Balch COMPLETE DIGITAL DESIGN, A Comprehensive Guide to Digital Electronics and Computer System Architecture 2003 by The McGraw-Hill Companies.
5. Ali Özdemir Digital Electronics ISBN 978-605-324-001-3, 2016, 220 pages.
6. Volnei A. Pedroni DIGITAL ELECTRONICS AND DESIGN WITH VHDL, 2008 by Elsevier Inc. All rights reserved.
7. A.H. Mammadov Microcircuitry textbook. Baku Chasioglu 2002
8. FHMammadov, A.H.Mammadov, M.A.Mammadov Fundamentals of Circuit Engineering Textbook Part I-II Baku 2007.
9. Gusev V.G., Gusev Yu.I. Electronics: Textbook for universities. 2-ое изд., перераб и дополн. - М.: Высшая школа, 1991г

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	
Total Workload	**210**
Total Workload/30(h)	**210/30**
ECTS Credits of the Course	**7**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Intelligent Systems
Course Unit Code	ATMF-B10
Type of Course Unit	Elective
Level of Course Unit	4
National Credits	
Number of ECTS Credits Allocated	7
Theoretical (hours/week)	3
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Hamidova Gulnar Abdulhamid

Name of Lecturer(s)	Hamidova Gulnar Abdulhamid
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The development in all areas of production is achieved as a result of the application of measurement, control, automatic regulation and automatic control systems in these areas, which is directly related to the widespread use of electronic devices. The role of electronic devices in increasing the reliability of electrical systems is great. Artificial intelligence is an independent scientific research field formed as a result of achievements in the field of mathematics and logic and on the basis of the knowledge accumulated by mankind about animate and inanimate nature. Intellectual information-retrieval systems consist of a communication system, a knowledge base and a database. Considering all this, it is clear that studying this subject is important.

Course Objectives:

The goal and main objective of teaching the subject is to provide future specialists with relevant knowledge about "Intelligent Systems" and to create in them the ability to effectively use this knowledge in their work. The knowledge acquired will be significantly useful for these specialists in maintaining, maintaining, and improving areas such as Intelligent Information-Retrieval Systems and Natural Language Communication Systems (NLC-systems).

Learning Outcomes

At the end of the course the student will be able to know		Assessment
1	Natural intelligent system - Man and his main mission	1, 2
2	The philosophical-associative essence of man	1, 2
3	Artificial intelligence is the basis of new information technology	1, 2
4	Intellectual information retrieval systems	1, 2
5	Intellectual application software packages	1, 2
6	Computational-logic systems	1, 2
7	Internally intellectualized system based on a functional approach	1, 2
8	Structure and design of intelligent systems	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL

1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	5
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	5
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 General concepts. Artificial intelligence	
2		LECTURE 2 Intellectual information retrieval systems. Structure and design of intellectual systems	
3		LECTURE 3 Structure and design of intellectual systems.Knowledge base design	
4		LECTURE 4 The structure of the knowledge base and its interaction with other components of intelligent systems. Metaknowledge level	
5		LECTURE 5 Knowledge representation and modeling	
6		LECTURE 6 Stages of designing intelligent systems	
7		LECTURE 7 Checklist for designing intelligent systems	
8		LECTURE 8 Number of stages in designing intelligent systems	

9		LECTURE 9 The next stages that determine the existence of intelligent systems	
10		LECTURE 10 Analysis of the subject area and methods of acquiring knowledge.	
11		LECTURE 11 Formation of knowledge in the knowledge base of intellectual systems during the study of economic and production systems	
12		LECTURE 12 Discovery of the source of knowledge. Intelligent agents. Tools used by the expert	
13		LECTURE 13 Methods of extracting knowledge from a subject matter expert. Technology for building expert systems	
14		LECTURE 14 Knowledge base intelligent editor	
15		LECTURE 15 Stages in the process of creating expert systems. Nanotechnology: Human Searches and Perspectives in Technology	

Recommended Sources

TEXTBOOK(S)

1. Andreychikov, A.V. Intellectual information systems: textbook for studies. узов, обуч. on spec. "Applied informatics in economics" / Andreychikov A. B., Андрейчикова O. N. - M.: Finance and statistics, 2004. - 424 p.
2. Voronov, A.E. Technology of using expert systems / A.E. Voronov. - M.: Laboratory books, 2011. - 109 p.
3. Intellectual systems: textbook / A. Semenov, N. Soloviev, E. Chernoprudova, A. Tsygankov; Ministry of Education and Science of the Russian Federation, Federal State Budget Educational Institution of Higher Professional Education "Orenburg State University". - Orenburg: ОГУ, 2013. - 236 pp.; то же [Electronic resource]. - URL:
4. Kudryavtsev V.B. Интелектуальные системы: учебник и практикум для бачалериата и магистратуры / В.Б. Kudryavtsev, E.E. Hasanov, A.S. Podkolzin. — 2-е изд., ispr. and the ball. — M.: Издательство Юрайт, 2018. — 219 c. [Electronic resource]. - URL:

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

Total Workload	**210**
Total Workload/30(h)	**210/30**
ECTS Credits of the Course	**7**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Expert Systems
Course Unit Code	ATMF-B10
Type of Course Unit	Elective
Level of Course Unit	4
National Credits	
Number of ECTS Credits Allocated	7
Theoretical (hours/week)	3
Practice (hours/week)	2
Laboratory (hours/week)	
Year of Study	4

Semester when the course unit is delivered	7
Course Coordinator	Ahmadova Esmira Neriman
Name of Lecturer(s)	Ahmadova Esmira Neriman
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

To teach students the theoretical foundations of expert systems, their architecture, knowledge representation methods, inference mechanisms, and their application in solving real-world problems. Also, to develop students' decision-making skills with artificial intelligence approaches.

Course Objectives:

Expert systems are knowledge-based systems that aim to mimic the decision-making skills of a human expert. This course covers topics such as the structure of expert systems, knowledge bases and inference mechanisms, the ability to work with uncertainty, inference engines, and knowledge engineering. The application of systems in medical diagnostics, technical maintenance, security analysis, and other areas is presented with practical examples.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	The expert will explain the basic concepts and structure of systems	1, 2
2	Will differentiate knowledge representation models and extraction methods	1, 2
3	Gain an understanding of expert systems working with uncertainty	1, 2
4	Able to design and model a simple expert system	1, 2
5	Expert systems will gain analysis and evaluation skills in real applications	1, 2
6	Be able to explain the role and process of knowledge engineering	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5

2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	5
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	5
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 General information about the application software package of expert systems. Defining and solving the problem of artificial intelligence	
2		LECTURE 2 The main tools for creating intelligent systems	
3		LECTURE 3 Principles of building knowledge-based systems. Data and knowledge	
4		LECTURE 4 Methods of describing knowledge	
5		LECTURE 5 Creating a knowledge base. Creating ESs using MS Access	
6		LECTURE 6 Services and application areas of ES. Principles of establishing management and decision-making systems	
7		LECTURE 7 Expert systems. General structure of expert systems	
8		LECTURE 8 Knowledge description model in expert systems Expert systems	
9		LECTURE 9 instrumental tools. Object-oriented programming	
10		LECTURE 10 Expert systems software	

11		LECTURE 11 PROLOG – standard predicates. PROLOG programming language. network structure	
12		LECTURE 12 LISP programming language	
13		LECTURE 13 Classification of expert systems. General characteristics of expert systems	
14		LECTURE 14 MS Access database management system. Organization of MS Access database	
15		LECTURE 15 Software and hardware tools of intellectual systems. Purpose and definition of expert systems	

Recommended Sources

TEXTBOOK(S)

1. Giarratano, J., & Riley, G. – Expert Systems: Principles and Programming, Cengage Learning
2. Jackson, P. – Introduction to Expert Systems, Addison Wesley
3. Turban, E., & Aronson, JE – Decision Support Systems and Intelligent Systems
4. Liebowitz, J. – Introduction to Expert Systems
5. Durkin, J. – Expert Systems: Design and Development
6. Aliev, RA, & Aliev, RR – Soft Computing and its Applications
7. Luger, GF – Artificial Intelligence: Structures and Strategies for Complex Problem Solving

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	
Total Workload	**210**
Total Workload/30(h)	**210/30**
ECTS Credits of the Course	**7**

Computer Science bachelor program, Department of "Programming and Information Security"

Course Unit Title	Internet technologies
Course Unit Code	ATMF-B11
Type of Course Unit	Elective
Level of Course Unit	4
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Mustafayeva Sabina Fazil

Name of Lecturer(s)	Mustafayeva Sabina Fazil
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Internet technologies " course functional-structure of a personal computer organization, information management device, information display device sections covers, intended to teach students important concepts and basic knowledge. Course consists of theoretical and SEMINAR classes. All technical terms are described and explained here Sections on its application and use in modern times are reflected.

Course Objectives:

Modern technical tools in the Internet technologies course learning and use are widely applied. That's why he studied in the appropriate directions, future specialists must master the capabilities of technical tools.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Objectives and tasks of "Internet technologies" teaching methodology science, scientific research methods, formation of ideas about their relationship with other sciences;	1, 2
2	Ideas about the forms of organization of "Internet technologies" training formation	1, 2
3	Forming ideas about the tools of "Internet technologies" training	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	3
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	4
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	4
4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5

6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	3
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Course Contents

Week	Chapter	Topics	Exam
1		LECTURE 1 Introduction to Internet technologies	
2		LECTURE 2 Development stages of Internet technologies	
3		LECTURE 3 Local and global networks. Network protocols	
4		LECTURE 4 Network operating systems	
5		LECTURE 5 Internet services: FTP, Email. WWW	
6		LECTURE 6 Multimedia technology, ILC, USENET, Skype	
7		LECTURE 7 Law of the Republic of Azerbaijan on Electronic Government. Electronic document circulation	
8		LECTURE 8 Internet security and privacy. Data encryption. HTTPS	
9		LECTURE 9 Using information resources in education.	
10		LECTURE 10 Classification of electronic educational resources	
11		LECTURE 11 Distance education. Organization and directions of distance education	
12		LECTURE 12 Development prospects of Internet technologies	
13		LECTURE 13 Differences between Internet service providers on a global scale, methods of connecting to the Internet	
14		LECTURE 14 Classification of Internet technologies	
15		LECTURE 15 The role of Internet technologies in information and communication technologies	

Recommended Sources

TEXTBOOK(S)

1. Karimov S.Q., Habibullayev S.B., Ibrahimzade T.I. Informatics. Textbook. Baku, 2011.-434p
2. http://compuser.info/index.php/bk/bk-drsri/183-compuser
3. http://komputerle.biz/view_post.php?id=25
4. http://www.globalspec.com/learnmore/electrical_electronic_components/wires_cables/ethernet_cables

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

Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program, Department of "Information Technologies"

Course Unit Title	Structured Programming
Course Unit Code	ATMF-B11
Type of Course Unit	Elective
Level of Course Unit	4
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hours/week)	2
Practice (hours/week)	1
Laboratory (hours/week)	
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Aliyev Goshgar Seyfullah
Name of Lecturer(s)	Aliyev Goshgar Seyfullah
Name of Assistant(s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject “Structured Programming” is included in the block of general professional subjects. The course teaches the process of solving problems on a computer; learning and mastering basic programming methods and techniques (structured); acquiring basic skills in debugging and testing programs. It mainly studies data structures in programming languages; programming methods and methods for developing effective algorithms for solving applied problems; modern tools for developing and analyzing software in high-level languages. Therefore, future specialists studying in the relevant areas should master this subject

Course Objectives:

It allows students to reveal their intellectual potential and form creative personalities who successfully function in the system of modern requirements. The objectives of the subject “Structured Programming” are: to introduce basic concepts in the field of programming; to introduce programming paradigms; to

form an understanding of the main stages of solving problems using a computer; to develop knowledge about the principles of data organization in computer memory, the main types of data in algorithmic programming languages; to study the main algorithmic constructions and their implementation in a programming language; to master the main methods and techniques of programming using the tools of a structured programming language.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	should use the tools of a structured programming language	1, 2
2	should introduce and develop programming paradigms	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	5
4	ability to use modern tools and methodologies in computing practice	4
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	3
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	4
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	2
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	3
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Course Contents

Week	Chapter	Topics	Exam

1		LECTURE 1 Introduction to the subject of "Structured Programming"	
2		LECTURE 2 Programming Methodologies. Basic Concepts and Definitions	
3		LECTURE 3 The concept of programming methodology and its types	
4		LECTURE 4 Procedural programming methodology	
5		LECTURE 5 Structured programming methodology	
6		LECTURE 6 Software development tools	
7		LECTURE 7 Basic concepts of a programming language	
8		LECTURE 8 Basic software development tools	
9		LECTURE 9 Programming environment and its components	
10		LECTURE 10 Data structuring	
11		LECTURE 11 Structuring algorithms	
12		LECTURE 12 The concept of an algorithm and its properties	
13		LECTURE 13 Language forms of algorithm representation	
14		LECTURE 14 Description of the algorithm with flowcharts	
15		LECTURE 15 Project structuring	

Recommended Sources

TEXTBOOK(S)

1. Koldaev, V.D. Fundamentals of algorithmization and programming: textbook / V. D. Koldaev; under the editorship prof. L. G. Gagarin. – Moscow: FORUM: ИНФРА-М, 2021. – 414 с. – https://znanium.com/read?id=361059 – Access mode: under subscription ТюмГУ.
2. Friesen, I.G. Fundamentals of algorithms and programming (PascalABC.NET environment): textbook / I.G. Friesen. - Moscow: ФОРУМ: ИНФРА-М, 2020. - 392 с. - URL: https://znanium.com/read?id=345722 - Access mode: under subscription ТюмГУ.
3. Rogov A.Yu. Fundamentals of procedural-structural programming: textbook / А.Ю. Rogov, V.I. Halimon, O.V. Sorry. – SPb.: SPbГТИ (ТУ), 2014. – 104 p.
4. Russell, J. Structural programming. / Jesse Russell, Ronald Cohn - per. с Англ.- М.: VSD, 2013.- 101 с.

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	
Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credits of the Course	**4**

Computer Science bachelor program

Course Unit Title	Internship
Course Unit Code	
Type of Course Unit	Compulsory
Level of Course Unit	4th year
National Credits	
Number of ECTS Credits Allocated	30
Theoretical (hours/week)	
Practice (hours/week)	
Laboratory (hours/week)	

Year of Study	4
Semester when the course unit is delivered	8
Course Coordinator	Sabina Ibrahimova
Name of Lecturer(s)	-
Name of Assistant(s)	-
Mode of Delivery	Face to Face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
A key stage of study where students apply theoretical knowledge into internship by participating in real projects under the guidance of experienced mentors.

Course Objectives:
To prepare students for independent professional activity, developing practical skills and professional competencies.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Consolidation and application of theoretical knowledge	1
2	Mastering practical skills	1
3	Formation of professional competencies	1
4	Understanding the manufacturing process	1
5	Development of independence	1
6	Creating a portfolio	1

Assessment Methods: 1. Internship Report

Course's Contribution to the Program

		CL
1	ability to apply mathematical tools to analyze software systems and data based on statistical and probabilistic models	5
2	ability to apply computer science theory and software engineering fundamentals to create computational solutions	5
3	ability to develop critical thinking and research methods to promote lifelong learning for personal and professional development	5

4	ability to use modern tools and methodologies in computing practice	5
5	ability to work effectively in teams to achieve common goals of designing, evaluating or implementing computing	5
6	ability to apply design and development principles to creating software systems of varying complexity	5
7	ability to design, implement and evaluate a computer system, process, architecture, component or program to meet desired needs	5
8	ability to apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine project effectiveness	5
9	ability to design and create software, web applications, mobile applications using modern development tools, libraries, templates and frameworks	5
10	ability to use foreign language skills to obtain the necessary information of a scientific and technical nature. Ability to use a foreign language to prepare presentations and in oral speech	4

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

Assessment

Internship Report	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

Total Workload	**900**
Total Workload/30(h)	**900/30**
ECTS Credits of the Course	**30**

Computer Sciences bachelor program, Department of "Programming and Information Security"

Course Unit Title	Planning and Design of Scientific Research
Course Unit Code	ATMF -B13
Type of Course Unit	Selection
Level of Course Unit	4 nd year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Gurbanov E.
Name of Lecturer (s)	Gurbanov E.
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
This course teaches students the main stages of scientific research—from identifying a problem to selecting methods, analyzing data, and presenting results scientifically—in a systematic way. The course develops both theoretical knowledge and practical skills.

Objectives of the Course:
The aim of the course is to provide students with fundamental and applied knowledge in planning, designing, conducting, and analyzing the results of the scientific research process, and to develop their ability to carry out scientific investigations.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1.	Can explain the fundamentals of scientific methodology.	1, 2
2.	Can formulate a research problem and hypothesis.	1, 2

3.	Has the ability to conduct a literature review and evaluate sources.	1, 2
4.	Can choose and justify different research designs.	1, 2
5.	Can develop a sampling strategy, data collection plan, and analysis plan.	1, 2
6.	Can design research in accordance with ethical principles.	1, 2
7.	Visualizes and interprets data and writes a scientific report.	1,2
8.	Explains the key principles of research reliability and reproducibility.	1,2

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

Course's Contribution to Program

		CL
1.	To teach students the essence of the scientific method and the main elements of research.	
2.	Skills in effective literature search and source evaluation.	
3.	Ability to recognize design types and choose an appropriate design.	
4.	Learning to plan sample size and sampling methods.	
5.	Teaching data collection methods and the reliability of instruments.	
6.	Applying ethical principles and legal requirements.	
7.	Introduction to basic statistical analyses and interpretation of results.	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction to Scientific Research Methodology	
2		Literature Review and Working with Scientific Sources	
3		Research Design and Experiment Planning	
4		Sample Selection and Statistical Planning	
5		Data Collection Methods	
6		Ethical and Legal Requirements in Scientific Research	
7		Analysis and Interpretation of Research Data	
8		Preparation of Scientific Reports and Publications	
9		Structure and Planning of a Research Project	

10		Qualitative and Quantitative Research Methods	

Recommended Sources TEXTBOOK(S)

1. Creswell, J. W. *Research Design*.
2. Kothari, C. R. *Research Methodology*.
3. Sekaran, U., Bougie R. *Research Methods for Business*.
4. Higgins & Green. *Cochrane Handbook for Systematic Reviews*.
5. Field, A. *Discovering Statistics Using SPSS/R*.

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

Computer Sciences bachelor program, Department of "Programming and Information Security"

Course Unit Title	Research Methods and Ethics
Course Unit Code	ATMF-B13
Type of Course Unit	Selection
Level of Course Unit	4 nd year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Gurbanov E.
Name of Lecturer (s)	Gurbanov E.
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
This subject teaches students the main methods of scientific research, the quantitative and qualitative approaches used in the research process, data collection strategies, data analysis, and the principles of research ethics. It also covers topics such as ethics committee requirements, research involving human and animal subjects, data confidentiality, and responsible scientific conduct.

Objectives of the Course:
To teach students the skills of planning scientific research, choosing appropriate methods, considering ethical issues, and adhering to standards of scientific conduct; and to ensure that research is carried out correctly, safely, and reliably.

Learning Outcomes

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

1	Explains the fundamental principles of research methods and selects appropriate methods.	1, 2
2	Formulates the research problem, objective, and hypothesis.	1, 2
3	Identifies and applies the differences between qualitative and quantitative research.	1, 2
4	Understands human subjects, animal ethics, and bioethical standards.	1, 2
5	Explains the procedures for applying to ethics committees.	1, 2
6	Applies ethical principles in data collection and processing.	1, 2
7	Acts in accordance with “Responsible Conduct of Research (RCR)” guidelines.	1,2
8	Prevents plagiarism, data fabrication, and other ethical violations.	1,2

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

Course’s Contribution to Program

		CL
1.	Scientific method, research stages, types of research.	
2.	Problem formulation, research question, structure of a hypothesis.	
3.	Interviews, focus groups, observation, thematic analysis.	
4.	Experiments, surveys, introduction to statistical analysis.	
5.	Sequential and concurrent designs; triangulation.	
6.	Experimental, cross-sectional, cohort, and case-study designs.	
7.	Survey design, measurement instruments, validity and reliability.	
8.	History of ethics, bioethics, scientific integrity.	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction to Research Methods and the Scientific Approach	
2		Problem Definition, Objectives, and Hypothesis	
3		Qualitative Research Methods	

4		Quantitative Research Methods	
5		Mixed Methods	
6		Research Design and Method Selection	
7		Data Collection and Instrument Reliability	
8		Introduction to Ethics and Principles of Scientific Conduct	
9		Application Process for Research Ethics Committees	
10		Ethical Dissemination of Research Findings	

Recommended Sources TEXTBOOK(S)

1. Creswell, J. W. — *Research Design*.
2. Kothari, C. R. — *Research Methodology: Methods and Techniques*.
3. Shamoo E., Resnik D. — *Responsible Conduct of Research*.
4. ICMJE Recommendations (International Committee of Medical Journal Editors).
5. COPE — Committee on Publication Ethics Guidelines.
6. Macrina, F. — *Scientific Integrity: Text and Cases in Responsible Conduct of Research*.

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

Computer Sciences bachelor program, Department of "Programming and Information Security"

Course Unit Title	**Scientific Writing and Publication Processes**
Course Unit Code	ATMF-B13
Type of Course Unit	Selection
Level of Course Unit	4 nd year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Gurbanov E.
Name of Lecturer (s)	Gurbanov E.
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
This course provides students with theoretical and practical knowledge on scientific writing style, the structure of scientific articles, working with literature, journal selection, digital tools, and the stages of the publication process. The course develops both writing skills and the effective presentation of scientific findings.

Objectives of the Course:
To teach students the skills to prepare scientific articles and reports, create scientific tables and graphs, justify results, submit articles to high-impact journals, and participate in the competitive peer-review process.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1.	Can explain the fundamental principles of scientific writing style.	1, 2

2.	Can apply the structure of a scientific article (IMRAD).	1, 2
3.	Has the ability to write clearly, logically, and accurately in academic language.	1, 2
4.	Prepares graphs, tables, and visual materials in accordance with scientific standards.	1, 2
5.	Can work with journal selection, publication guidelines, and ethical norms.	1, 2
6.	Understands the peer-review process and can write a response letter.	1, 2
7.	Can prepare grant proposals, posters, and scientific presentations.	1,2

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

Course's Contribution to Program

		CL
1.	Characteristics of academic language: objectivity, accuracy, logical coherence, and style of expression.	
2.	Introduction, Methods, Results, Discussion structure; standard sections of an article.	
3.	Problem statement, literature gap, objectives, and hypothesis.	
4.	Description of research design, sample selection, tools used, and protocols.	
5.	Graphs, tables, descriptive statistics, and principles of visual design.	
6.	Interpretation of results, limitations, and directions for future research.	
7.	Structured and unstructured abstracts; effective selection of keywords.	
8.	APA, MLA, Vancouver, Harvard styles; reference management software (Zotero, Mendeley).	
9.	Generic and specialized journals, indexing (Scopus, WoS), Impact Factor, Q1–Q4.	

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

Course Contents

Week	Chapter	Topics	Exam

1		Introduction to Scientific Writing and Academic Style	
2		Overall Structure of a Scientific Article (IMRAD)	
3		Writing the Introduction Section and Formulating the Problem	
4		Writing the Methods Section	
5		Writing the Results and Preparing Graphs	
6		Discussion Section and Scientific Interpretation	
7		Grant Proposals and Project Applications	
8		References and Citation Systems	
9		Journal Selection and Publication Strategies	
10		Open Science, Preprints, and Scientific Communication	

Recommended Sources TEXTBOOK(S)

1. Day, R. A., Gastel, B. *How to Write and Publish a Scientific Paper*.
2. Glasman-Deal, H. *Science Research Writing*.
3. Cargill, M., O'Connor, P. *Writing Scientific Research Articles*.
4. Wallwork, A. *English for Writing Research Papers*.
5. COPE Guidelines for Publication Ethics.

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