MODULE HANDBOOK

BSc in Mechatronics and Robotics Engineering

CONTENTS

Mechatronics and Robotics Engineering 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	1st year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Gunel Rahimli Ashraf
Name of Lecturer (s)	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.

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

Learning Outcomes

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 Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	2
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	2
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	2
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	2
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 PREHİSTORY TİME Seminar 1	
2		ANCİENT STATES İN AZERBAİJAN. MANNA, ATROPATENA, ANCIENT ALBANIA Seminar 2	
3		AZERBAIJAN IN THE III-VII CENTURES Seminar 3	
4		AZERBAIJAN UNDER THE ARAB CALIPHATE Seminar 4	
5		AZERBAIJAN IN THE 9TH TO THE EARLY 13^{RD} CENTURIES Seminar 5	
6		AZERBAIJAN IN THE 14^{TH} CENTURY TO 15^{TH} CENTURES Seminar 6	
7		AZERBAIJAN SAFAVID STATE Seminar 7	
8		KHANATES OF AZERBAIJAN Seminar 8	
9		AZERBAIJAN IN THE XIX CENTURES 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. Red. M.Abdullayev. Baku, 2015, 2019 412 p.
2. The History of the Caucasian Albanians" by Movses Khorenatsi (translated by R. W. Thomson)
3. Azərbaycan tarixi üzrə qaynaqlar., S.S.Əliyarov və Y.M.Mahmudovun redaktəsi ilə. Bakı, Çıraq, 2007.400 p.
4. The Politics of Culture in Soviet Azerbaijan, 1920-40, Audrey Altstadt, Published January 12, 2018 by Routledge
5. The Azerbaijani Turks: Power and Identity under Russian Rule, Audrey Altstadt, Publisher Hoover Institution Press; 1992
6. А.М. Шихсаидов. Кавказская Албания и её письменность" (Caucasian Albania and Its Writing. 2001
7. Qasımov X. Orta əsrlərdə Azərbaycan mədəniyyəti. Bakı,Azpoliqraf, 2008
8. Əliyev K. Əliyeva F. Azərbaycan antik dövürdə. Bakı, 1997
9. Vəlixanlı N.M. IX-XII əsr ərəb cəğrafiyaşünas-səyyahları Azərbaycan haqqında Bakı, 1974.
10. Vəlixanlı N.M. Ərəb xilafəti və Azərbaycan. Bakı, 1993.
11. Məmmədzadə M.B. Milli Azərbaycan hərəkatı. 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 Credit of the Course	**5**

Mechatronics and Robotics Engineering 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 (hour/week)	
Practice (hour/week)	7
Laboratory (hour/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	

Name of Lecturer (s)	
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.

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

Learning Outcomes

	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
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 Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	3
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	2
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Marketing-Reading 1**;Reading skill; Work with the video	
2		**Unit 1. Marketing-Reading 2**; Critical Thinking Strategy; Vocabulary Skill	
3		**Unit 1. Marketing-Writing skill**; Grammar: Present Continuous; Unit assignment	

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

25		**Unit 5. Business-Reading 1**;Reading skill; Work with the video	
26		**Unit 5. Business -Reading 2**; Vocabulary Skill	
27		**Unit 5. Business-Writing skill**; Grammar: Comparative and Superlative adjectives; Unit assignment; Critical Thinking Strategy;	
28		**Unit 5. Sociology: Listening 1;** Note-taking Skill, Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
29		**Unit 5 . Sociology: Speaking skill**;Grammar:Auxiliary verbs in questions; Pronounciation; Unit Assignment	
30		**Unit 6. Brain Science-Reading 1**;Reading skill; Work with the video	
31		**Unit 6. Brain Science -Reading 2**; Critical Thinking Strategy; Vocabulary Skill	
32		**Unit 6. Brain Science-Writing skill**; Grammar: Infinitives of purpose; Unit assignment	
33		**Unit 6. Behavioral Science: Listening 1;** Note-taking Skill; Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
34		**Unit 6. Behavioral Science: Speaking skill** Grammar: Imperative verbs; Pronounciation; Unit Assignment	
35		**Practice:** Social media & Digital Communication	
36		**Practice:** Learning from Tv shows&movies	
37		**Review (Units 4-6)**	
38		**Achievement – 2**	
39		**Unit 7. Environmental Science**-**Reading 1;**Reading skill; Work with the video	
40		**Unit 7. Environmental Science** -**Reading 2**; Critical Thinking Strategy; Vocabulary Skill	
41		**Unit 7. Environmental Science** -**Writing skill**; Grammar: Simple Past and Past continuous; Unit assignment	
42		**Unit 7. Environmental Science**: **Listening 1;** Note-taking Skill, Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
43		**Unit 7. Environmental Science**: **Speaking skill;** Grammar: Future with will; Pronounciation; Unit Assignment	
44		**Unit 8. Public Health**-**Reading 1**;Reading skill; Work with the video	
45		**Unit 8. Public Health** -**Reading 2;** Critical Thinking Strategy; Vocabulary Skill	
46		**Unit 8. Public Health** -**Writing skill**; Grammar Adverbs of manner and degree; Unit assignment	
47		**Unit 8. Public Health** : **Listening 1;** Note-taking Skill, Listening Skill, Critical Thinking Strategy;	

		Listening 2; Work with the video; Vocabulary Skill	
48		**Unit 8. Public Health**: **Speaking skill;** Grammar: If clauses for future possibility; Pronounciation; Unit Assignment	
49		**Practice:** Storytelling&Fluency development	
50		**Practice:** Modern English & Everyday expressions	
51		**Review (units 7-8)**	
52		**Achievement – 3**	
53		**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. • 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 Credit of the Course	**7**

Mechatronics and Robotics Engineering 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 (hour/week)	
Practice (hour/week)	7
Laboratory (hour/week)	
Year of Study	1
Semester when the course unit is delivered	2

Course Coordinator	Jala Asgarova
Name of Lecturer (s)	Jala Asgarova
Name of Assistant (s)	-
Mode of Delivery	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.

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Enrich understanding of how language works
Enhance confidence in interacting with others in a variety of contexts using the English language
Increase linguistic knowledge of specific aspects of work or study in contexts where English is the center of communication read and understand texts will meet in your degree studies

Learning Outcomes

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
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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
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Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	3
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4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
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10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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			
Week	Chapter	Topics	Exam
1		**Unit 1. Sociology. How do you make a good first impression?** Reading 1: Small talk. Reading Skill: Main ideas and supporting details	
2		**Unit 1. Sociology. How do you make a good first impression?** Reading 2: 21st Century job interviews. Critical Thinking Strategy: A causal chain.	

3		**Unit 1. Sociology. How do you make a good first impression?** Work with the video: Advice on a good first impression Vocabulary skill: Using the dictionary	
4		**Unit 1. Sociology. How do you make a good first impression?** Writing skill: Organizing and developing a paragraph Grammar: Real conditionals. Present and future	
5		**Unit 1. Sociology. Are first impression accurate?** Note-taking Skill: to summarize a lecture Listening 1: The psychology of first impressions.	
6		**Unit 1. Sociology. Are first impression accurate?** Listening Skill: Listening for main ideas. Listening 2: A review of books about first impression.	
7		**Unit 1. Sociology. Are first impression accurate?** Work with the video: Interview mistakes. Vocabulary skill: suffixes. Grammar: Auxiliary verbs: do, be, have	
8		**Unit 1. Sociology. Are first impression accurate?** Pronounciation: Contractions with helping verbs	
9		**Unit 2. Nutritional science. What makes food attractive?** Reading 1: Knowing your taste. Reading skill: previewing a text	
10		**Unit 2. Nutritional science. What makes food attractive?** Reading 2: Eating with our eyes. Critical thinking strategy: Making inferences	
11		**Unit 2. Nutritional science. What makes food attractive?** Vocabulary skill: Using content to understant words.	
12		**Unit 2. Nutritional science. What makes food attractive?** Writing skill: Writing descriptive adjectives. Grammar: Use and placement of adjectives	
13		**Unit 2. Nutritional science. Why do we change the foods we eat?** Listening 1: A billion pounds of spices	
14		**Unit 2. Nutritional science. Why do we change the foods we eat?** Critical Thinking Strategy: predicting topics and ideas Listening 2: A world of food	
15		**Unit 2. Nutritional science. Why do we change the foods we eat?** Grammar: Quantifiers with count and noncount nouns	
16		**Unit 2. Nutritional science. Why do we change the foods we eat?** Pronunciation: links with [j]and [w] Speaking skill: Giving advice	
17		**Unit 3. Information technology. How has technology affected our lives?** Reading 1: Cars that think Reading Skill: taking notes	
18		**Unit 3. Information technology. How has technology affected our**	

		lives? Reading 2: Classrooms without walls	
19		**Unit 3. Information technology. How has technology affected our lives?** Vocabulary skill: Synonyms Writing skill: Writing a summary and personal response	
20		**Unit 3. Information technology. How has technology affected our lives?** Grammar: Parallel structure	
21		**Unit 3. Psychology. In what ways is change good or bad?** Listening 1: Shaped by change, promoting change. Listening skill: Listening for time markers	
22		**Unit 3. Psychology. In what ways is change good or bad?** Critical thinking Strategy: summarizing information Listening 2: An interview with Barbara Ehrenreich	
23		**Unit 3. Psychology. In what ways is change good or bad?** Vocabulary skill: a word web Grammar: Tag questions.	
24		**Unit 3. Psychology. In what ways is change good or bad?** Pronounciation: Intonation in tag questions Speaking skill: Asking for and giving reasons	
25		**Unit 4. Marketing. Does advertising help or harm us?** Reading 1: Can targeted ads change you?	
26		**Unit 4. Marketing. Does advertising help or harm us?** Reading 2: In defence of advertising. Work with the Video: How algorithms changed the world?	
27		**Unit 4. Marketing. Does advertising help or harm us?** Vocabulary skill: Synonyms Writing skill: An opinion essay	
28		**Unit 4. Marketing. Does advertising help or harm us?** Grammar: Compound sentences	
29		**Unit 4. Marketing. How does advertising affect our behaviour?** Note-taking skill: A mind map to note opinions Listening 1: Targeting children with advertising	
30		**Unit 4. Marketing. How does advertising affect our behaviour?** Listening skill: Fact and opinion Listening 2: The influence of online ads	
31		**Unit 4. Marketing. How does advertising affect our behaviour?** Vocabulary skill: Context clues to identify meaning Grammar: Modals expressing attitude	
32		**Unit 4. Marketing. How does advertising affect our behaviour?** Pronouncition: intonation in questions Speaking skill: Giving and supporting your opinions	
33		**Unit 5**. **Psychology. How do people overcome obstacles?** Reading 1: How people learn to become resilient. Reading skill: Referents to understand contrast.	

34		**Unit 5**. **Psychology. How do people overcome obstacles?** Reading 2: The climb of my life. Work with the video: Shona regains her confidence	
35		**Unit 5**. **Psychology. How do people overcome obstacles?** Vocabulary skill: Using the dictionary to find the correct meaning.	
36		**Unit 5**. **Psychology. How do people overcome obstacles?** Writing skill: Writing a narrative essay. Grammar: Shift between past and present time frames.	
37		**Unit 5**. **Behavioral science. Does taking risks change our lives?** Listening 1: A lifetime of risks	
38		**Unit 5**. **Behavioral science. Does taking risks change our lives?** Listening Skill: listening for different kinds of numbers Listening 2: Science on the edge.	
39		**Unit 5**. **Behavioral science. Does taking risks change our lives?** Vocabulary skill: word families Grammar: Past perfect	
40		**Unit 5**. **Behavioral science. Does taking risks change our lives?** Speaking skill: Giving a short presentation	
41		**Unit 6**. **Neurology. Are you a good decision maker?** Reading 1: The lazy brain. Reading Skill: using a graphic organizer	
42		**Unit 6**. **Neurology. Are you a good decision maker?** Reading 2: Problem-solvers.	
43		**Unit 6**. **Neurology. Are you a good decision maker?** Vocabulary skill: phrasal verbs Writing skill: stating reasons and giving examples	
44		**Unit 6**. **Neurology. Are you a good decision maker?** Grammar: Gerunds and infinitives	
45		**Unit 6. Neurology. Will AI ever be as smart as humans?** Listening skill: inferring a speaker's attitude Listening 1: What kind of smart is AI?	
46		**Unit 6. Neurology. Will AI ever be as smart as humans?** Listening 2: Asking the right questions about AI	
47		**Unit 6. Neurology. Will AI ever be as smart as humans?** Vocabulary skill: Using the dictonary Grammar: Gerunds and infinitivesas the objects of verbs	
48		**Unit 6. Neurology. Will AI ever be as smart as humans?** Speaking skill: Leading a group discussion.	
49		**Unit 7. Economics. Can a business earn money while making a difference**? Reading 1: FEED project. Reading skill: using a timeline	
50		**Unit 7. Economics. Can a business earn money while making a difference**? Reading 2: A new business models. Vocabulary skill: collocations with verbs	

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

Recommended Sources

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.
- 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 Credit of the Course	**8**

Mechatronics and Robotics Engineeringbachelor program, Department of “Azerbaijani Language and Literature”

Course Unit Title	Business and Academic Communication in Azerbaijani
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 (hour/week)	
Practice (hour/week)	3
Laboratory (hour/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Alasgarova Solmaz Hashim
Name of Lecturer (s)	Alasgarova Solmaz Hashim
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani
Prerequisites	-
Recommended Optional Program Components	-

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.	1, 2
3	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
4	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
5	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
6	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 acquire theoretical and practical work on business rhetoric.	1, 2
7	Be able to prepare written and oral presentations in the specialty in Azerbaijani.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course’s Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	3
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	2

4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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.) SEMİNAR 11. Auxiliary parts of speech, their stylistic possibilities in speech	
8		SEMİNAR 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		SEMİNAR 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. Xəlilov Buludxan. Azərbaycan dilində işgüzar və akademik kommunikasiya. Bakı, 2021
2. Şiriyev Fikrət. Azərbaycan dilinin nitq mədəniyyəti və kommunikasiya. Bakı, 2021
3. Babayev Adil. Azərbaycan dili və nitq mədəniyyəti. Bakı, 2011
4. Məmmədli N. Azərbaycan dilində işgüzar və akademik kommunikasiya. Bakı, 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 Credit of the Course	**4**

Mechatronics and Robotics Engineering 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 (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Gunel Mustafayeva Nuraddinovna
Name of Lecturer (s)	Gunel Mustafayeva Nuraddinovna
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 to approach logic as a branch of philosophy through brain work, language, deductive and inductive logic, The Art of judgment, and classroom discussions. The main attention is paid to the study of the mechanism of argumentation and expression of the idea. Particular attention is paid to logical errors. The problems and challenges of modern times will also be analyzed and discussed.

Objectives of the Course:
Students should leave this course by understanding the basic concepts of logic; to demonstrate an understanding of the central questions of logic as a field of philosophy, to become familiar with the art of judgment and to create an idea of the main challenges of modern times.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Students should leave this course by understanding the basic concepts of logic	1, 2

2	to demonstrate an understanding of the central questions of logic as a field of philosophy, to become familiar with the art of judgment and to create an idea of the main challenges of modern times.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	2
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	3
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 Course. A VERY Brief Discourse to the Main Philosophical Currents	

2		Seminar 1. Introduction to Course.A VERY Brief Discourse to the Main Philosophical Currents	
3		LECTURE 2. Main Philosophical Concepts I: Being, Personal Identity, Body/Soul	
4		LECTURE 3. Main Philosophical Concepts II: Being, Personal Identity, Body/Soul	
5		Seminar 2. Main Philosophical Concepts II: Being, Personal Identity, Body/Soul	
6		LECTURE 4. Main Philosophical Concepts III: Free will	
7		Seminar 3. Main Philosophical Concepts III: Free will	
8		LECTURE 5. Argumentation theory and philosophy. Logical fallacies	
9		Seminar 4. Argumentation theory and philosophy. Logical fallacies	
10		LECTURE 6. Introduction to Political Philosophy	
11		Seminar 5. Introduction to Political Philosophy	
12		LECTURE 7. Labor and Property	
13		Seminar 6. Labor and Property	
14		Seminar 7. Minds, Brains and Computers (Artificial Intelligence)	
15		Seminar 8. Philosophy and the Ecological problems	

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”, Prinston University Press 2014.
7. Craig Edward, “Philosophy: A very short Introduction”, Oxford University Press Inc., New York 2002
8. Eco Umberto, “Eternal Fascism: Fourteen Ways of Looking at a Blackshirt “Writing in New York Review of Books, 22 June 1995, pp.12-15.
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 F.A., “The Road to Serfdom”, University of Chicago Press, 1944.
14. Hobbes Thomas, “Leviathan”.
15. Hume David, “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. Kurzweil Ray, “The Singularity is Near: when humans transcend biology”, Penguin Books Ltd., London, 2005.
18. Locke John, “An Essay Concerning Human Understanding” (Chapter XXVII “Of Identity and Diversity”), 2nd Edition.
19. Locke John,” 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 Credit of the Course	**3**

Mechatronics and Robotics Engineering 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 (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Elvin Xudaverdiyev Elshan
Name of Lecturer (s)	Elvin Xudaverdiyev Elshan
Name of Assistant (s)	-

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

Course description:
Multiculturalism introduction to the subject of different cultures, ethnic groups and social identitetlərin combination of existence and mutual connection, learning a single lesson. This subject provides students, in contrast to the cultures, values, customs and world encounters information about gives, while at the same time multiculturalism, social, political and economic aspects explores.

Objectives of the Course:
Multiculturalism introduction of the subject goal, different cultures and ethnic groups, relationships to understand, realize the value of cultural diversity and promote social harmony. This subject covers students, principles of multiculturalism, cross-cultural communication and integration processes along with learning, social justice, equality and human rights, questions and discussions. As a result, students who have positive relationships between different cultures will contribute to the development of knowledge and skills they master.

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	Multiculturalism subject introduction results of cultures to, empatiya and respect growth, development of tolerance, social knowledge, improvement of communication skills, reinforcement, integration and social harmoniyanı assistance to examiners, as well as critical thinking skills to develop covers.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	2
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	2
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2

6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Quliyev, R. (2015). Multikulturalizmin əsasları.
2. Xudaverdiyev Elvin- Azərbaycanın multikulturalizm siyasəti (2023)
3. Məmmədov, A. (2018). Azərbaycan cəmiyyətində multikulturalizm.
4. Əliyeva, S. (2020). Mədəni müxtəliflik və sosial harmoniya.
5. Kymlicka, W. (1995). Multicultural Citizenship: A Liberal Theory of Minority Rights.
6. Taylor, C. (1992). Multiculturalism and the Politics of Recognition.
7. Parekh, B. (2000). Rethinking Multiculturalism: Cultural Diversity and Political Theory.

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

Course Policies

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

ECTS allocated based on Student Workload

Total Workload	**90**
Total Workload/30(h)	**90/30**

ECTS Credit of the Course	**3**

Mechatronics and Robotics Engineering bachelor program, Department of "Psychology"

Course Unit Title	Sociology
Course Unit Code	ÜFS-B04
Type of Course Unit	Elective
Level of Course Unit	2^{nd} year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	1
Course Coordinator	Gasimov Azar Ali
Name of Lecturer (s)	Gasimov Azar 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 Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	2
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	3
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		LECTURE 8. Education and sociology Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Giddens, A. (2009). *Sociology*. Polity Press.
2. Macionis, J. J. (2018). *Sociology*. Pearson.
3. Ritzer, G. (2021). *Sociological Theory*. McGraw-Hill.
4. Haralambos, M., & Holborn, M. (2013). *Sociology: Themes and Perspectives*. Collins.
5. Berger, P. L., & Luckmann, T. (1966). *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. Penguin Books
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, C. W. (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 Credit of the Course	**3**

Mechatronics and Robotics Engineering 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 (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/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	Face to face
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 Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	2
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	2
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2

5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Azərbaycan Respublikasının Konstitusiyası
2. S.S. Allahverdiyev. Azərbaycan Respublikası Konstitusiyasının və hüququn əsasları. Dərslik. Bakı, 2012
3. V.V. Lazarev. Ümumi hüquq və dövlət nəzəriyyəsi. Bakı, 2007
4. S.S. Allahverdiyev, Azərbaycan Respublikası Konstitusiyasının və hüququn əsasları. Dərslik. Bakı, 2010
5. Frederik Bastiat, Hüquq, Bakı, 2007
6. Azərbaycan Respublikasının "Normativ hüquqi aktlar haqqında" Konstitusiya Qanunu, Bakı, 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 Credit of the Course	**3**

Mechatronics and Robotics Engineering bachelor program, Department of "Philosophy"

Course Unit Title	Logic
Course Unit Code	ÜFS-B04
Type of Course Unit	Elective
Level of Course Unit	2^{nd} year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Gunel Mustafayeva Nuraddinovna

Name of Lecturer (s)	Gunel Mustafayeva Nuraddinovna
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 to approach logic as a branch of philosophy through brain work, language, deductive and inductive logic, The Art of judgment, and classroom discussions. The main attention is paid to the study of the mechanism of argumentation and expression of the idea. Particular attention is paid to logical errors. The problems and challenges of modern times will also be analyzed and discussed.

Objectives of the Course:
Students should leave this course by understanding the basic concepts of logic; to demonstrate an understanding of the central questions of logic as a field of philosophy, to become familiar with the art of judgment and to create an idea of the main challenges of modern times.

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	the study of the content of the subjects and problems of the discipline, its basic concepts and their use in other philosophical and humanitarian disciplines	1, 2
2	the student should be able to freely analyze the ideas contained in philosophical schools and compare them	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	3
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	3
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	3
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	3

5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	3
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	3
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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, by Colin Allen, Michael Hand
4. Logic. An Introduction to Elementary Logic - 2nd Edition, by Colin Allen, Michael Hand
5. Philosophy of Logic, 1986, by W. V. Quine The 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 Credit of the Course	**3**

Mechatronics and Robotics Engineering 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 (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Gunel Mustafayeva Nuraddinovna
Name of Lecturer (s)	Gunel Mustafayeva Nuraddinovna
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description: This 30-hour course deeply explores the ethical and aesthetic concepts that form two fundamental areas of philosophy shaping human values, moral decision-making, and artistic experience. Students will engage with key philosophical texts, theories, and debates to understand how ethical principles guide human behavior and how aesthetic values influence our perception of art, beauty, and culture. The course covers classical and modern approaches, from Plato and Aristotle to Kant, Nietzsche, Weber, and Adorno, examining the relationships between morality, art, and society. Through critical discussions, analyses, and philosophical inquiries, students will gain a deeper understanding of ethical thought and aesthetic judgment in both historical and contemporary contexts.		
Objectives of the Course: By the end of this course, students will: 1. Understand key ethical and aesthetic theories, including ethics and values, deontology, utilitarianism, theories of beauty, and the sublime. 2. Analyze the intersections of ethical and aesthetic concepts in cultural, political, and artistic domains. 3. Evaluate ethical dilemmas and aesthetic disputes based on philosophical frameworks. 4. Engage critically with philosophical texts and apply theoretical concepts to real-world situations. 5. Formulate well-reasoned perspectives on moral and aesthetic issues.		
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 Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	2
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	2
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2

5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		SEMINAR 6.Moral sense and moral practice	
12		LECTURE 7. Applied ethics and its scope	
13		SEMINAR 7. Applied ethics and its scope	

14		LECTURE 8. Ethical principles in professional activity	
15		SEMINAR 8.Moral sense and moral practice	

Recommended Sources

TEXTBOOK(S)

1. Qızılgül Abbasova. Etika: tarix, nəzəriyyə və təcrübə (dərs vəsaiti). Bakı, 2016
2. Sevinc Şahhüseynova, Etika, Bakı, 2009
3. Aristotel, Siyasət. Böyük etika, Bakı, 2006
4. Nəsirəddin Tusi, Əxlaqi Nasiri, Bakı,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 Credit of the Course	**3**

Mechatronics and Robotics Engineering 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	4^{th} 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	Hajiyeva Rana Javadkhan
Name of Lecturer (s)	Hajiyeva Rana 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	Formation of ideas about the forms of organizing computer science training	1, 2
3	Formation of ideas about the means of teaching informatics	1, 2
4	Formation of ideas about the principles and teaching methods of computer science training	1, 2
5	Formation of ideas about the goals and objectives of Informatics training for undergraduate students	1, 2
6	Performing practical tasks used in the training of Informatics 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 Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3

10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Type 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 othe 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 DBM	

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. Hacıyeva R.C. İnformatika. Mühazirələr toplusu, QKU-nun Poliqr.və Nəşr.mərkəzi, Bakı, 2020, 180 səh.
2. Широкова А. И., Пышняк М. Информатика. Разработка программ на языке программирования Питон , М., 2020, 144 с.
3. Əlizadə M.N., Orucova T.V., Həsənova N.Ə. İnformasiya təhlükəsizliyi. Bakı, "MSV Nəşr", 2018, 388 səh.
4. Информатика для экономистов. Учебник для бакалавриата и специалитета / ред. Поляков В. П. М.: Юрайт, 2019. 524 с.
5. Ляхович В.Ф., Молодцов В.А., Рыжикова Н.Б. Основы информатики. — М.: КноРус, 2016. — 348 с.
6. Макарова Н. В. Информатика: Учебник для вузов. Издательство: Питер, 2013, 576 с.
7. Информатика и информационные технологии / ред. Ю.Д. Романова. — М.: Эксмо, 2011. — 544 с.
8. Просветов Г.И. Анализ данных с помощью Excel. Задачи и решения. — М.: Альфа-Пресс, 2015. — 160 с
9. Набиуллина С.Н. Информатика и ИКТ. Курс лекций. М.: Лань, 2019. 72 с.
10. Гасумова С. Е. Социальная информатика. Учебник и практикум для вузов. М.: Юрайт, 2019. 284 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	**90**
Total Workload/30(h)	**90/30**
ECTS Credit of the Course	**3**

Mechatronics and Robotics Engineering 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	4^{th} 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	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 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 Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	4

2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	3
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	3
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	3
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	3
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	3
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 Seminar 8. Using other applications	

Recommended Sources

TEXTBOOK(S)

1. Hacıyeva R.C. İnformatika. Mühazirələr toplusu, QKU-nun Poliqr.və Nəşr.mərkəzi, Bakı, 2020, 180 səh.
2. Широкова А. И., Пышняк М. Информатика. Разработка программ на языке программирования Питон , М., 2020, 144 с.
3. Əlizadə M.N., Orucova T.V., Həsənova N.Ə. İnformasiya təhlükəsizliyi. Bakı, “MSV Nəşr”, 2018, 388 səh.
4. Информатика для экономистов. Учебник для бакалавриата и специалитета / ред. Поляков В. П. М.: Юрайт, 2019. 524 с.
5. Ляхович В.Ф., Молодцов В.А., Рыжикова Н.Б. Основы информатики. — М.: КноРус, 2016. — 348 с.
6. Макарова Н. В. Информатика: Учебник для вузов. Издательство: Питер, 2013, 576 с.
7. Информатика и информационные технологии / ред. Ю.Д. Романова. — М.: Эксмо, 2011. — 544 с.
8. Просветов Г.И. Анализ данных с помощью Excel. Задачи и решения. — М.: Альфа-Пресс, 2015. — 160 с
9. Набиуллина С.Н. Информатика и ИКТ. Курс лекций. М.: Лань, 2019. 72 с.
10. Гасумова С. Е. Социальная информатика. Учебник и практикум для вузов. М.: Юрайт, 2019. 28 с.
11. Abasov B. Microsoft Access verilənlər bazasının idarəetmə sistemi. Bakı, 2009.
12. «Информатика для экономистов». Учебник. Под ред. проф. В.М. Матюшка. М., ИНФРА-М, 2006.
13. Евдокимов В.В. Экономическая информатика, учебник для вузов, СПб.: Питер, 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 Credit of the Course	**3**

Mechatronics and Robotics Engineering 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	4^{th} 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	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.

Objectives of the Course:

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 Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	2
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	2
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Əfəndiyəv, M. (1998) Siyasi elmin problemləri. Bakı
2. Hüseynov, R. (2017) Politologiya. Bakı
3. Şirəliyev H., Əhmədov Ə. (1997) Politologiya. Bakı
4. Şiraliyev H. (1998) Politologiya. Bakı
5. Teymurlu, M. (2014) Politologiya. Bakı
6. Azərbaycan Dövlət İqtisad Universiteti (2004) Politologiya (Dərs vəsaiti). Bakı
7. Василик М. А. (ред.) (2001). Политология. Москва: Гардарики.
8. Пугачев В.П., Соловьев, А.И. (1998). Введение в политологию. Москва: Аспект Пресс.
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 Credit of the Course	**3**

Mechatronics and Robotics Engineering bachelor program, Department of "Marketing and Management"

Course Unit Title	Fundamentals of entrepreneurship and introduction to business
Course Unit Code	ÜFS-B05
Type of Course Unit	Elective
Level of Course Unit	4^{th} 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	Alberto Levy
Name of Lecturer (s)	Alberto Levy
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
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 amidst the contextual reality of today's extreme uncertainty. These skills will also be particularly relevant for future employment and businesses, as organisations increasingly need to be agile and take an experimental approach to build valuable innovations and business models that positively affect society and meet the needs of the market.

Objectives of the Course:

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

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 Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	3
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	3
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	3
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	3
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	3
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 Credit of the Course	**3**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Linear Algebra and Analytic Geometry
Course Unit Code	İF-BO1
Type of Course Unit	Compulsory
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Tagiyev Rauf Mursal
Name of Lecturer (s)	Tagiyev 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 teaching of the subject "Linear Algebra and Analytical Geometry" is intended to teach students the basic concepts of the subject, to master basic knowledge about the matrix calculus of mathematics, methods for solving systems of linear equations, vector calculus, finding and applying analytical expressions for straight lines and curves in the plane and space. 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:
Elements of "linear algebra and analytical geometry" are applied in computing, programming, and various fields of economics. Therefore, specialists in the given areas must master the basics

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.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	3
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	3
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	3

6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 Rorres. Elementary linear algebra. 7-th edition, John Wiley& Sons, INC.
2. Демидович В.П., Кудрявцев В. А. Краткий курс высшей математики. М.: «Наука», 2001.
3. Ильин В. А., Куркина А. В. Высшая математика М.: 2005.
4. Ильин В. А., Позняк Э. Г. Линейная алгебра. М.: «Наука», 1981.
5. Беклемишев Д. В. Курс аналитической геометрии и линейной алгебры. М., «Высшая школа», 1998.
6. Alexander Akhmerov, Alexander Tyurin "Fundamental Higher Mathematics Linear Algebra and Analytical Geometry P.I" Publisher: LAP LAMBERT Academic Publishing 2019. 264 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	**120**
Total Workload/30(h)	**120/30**
ECTS Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Calculus
Course Unit Code	İF-BO2
Type of Course Unit	Compulsory
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	8
Theoretical (hour/week)	3
Practice (hour/week)	3
Laboratory (hour/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:riyazi analizin əsas üsullarını bilmək və praktikada tətbiq etməyi bacarmaq; • must be able to understand and apply the computer in practice to implement technologies for solving various problems of mathematical analysis; • have the skills to solve practical problems of mathematics; 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.
Objectives of the Course: 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.)	1, 2
2	Conduct analysis of limits and infinitely small/large functions	1, 2
3	Apply the concepts of derivative and integral of a function to practical problems	1, 2
4	Conduct analytical analysis of sets, functions, and sequences	1, 2
5	Ability to construct and prove mathematical arguments	1, 2
6	Analyze and solve difficult analytical problems step by step	1, 2
7	Construct and analyze mathematical models in real-life and applied problems	1, 2
8	Apply the concepts of derivative and integral to physics, engineering, and economics	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4

5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Limit of a numerical sequence Lesson 2. Limit and basic properties of a numerical sequence Seminar 1	
2		Lesson 3. Function and its limit Seminar 2 Seminar 3	
3		Lesson 4. Continuity Lesson 5. Derivation Seminar 4	
4		Lesson 6. The rule of taking the derivative, derivatives of basic elementary functions Seminar 5 Seminar 6	

5		Lesson 7. Basic theorems of differential calculus Lesson 8. Applications of differential calculus Seminar 7	
6		Lesson 9. Studying a function by extremum Seminar 8 Seminar 9	
7		Lesson 10. Indefinite integral Lesson 11. Basic properties of the indefinite integral, basic integration methods Seminar 10	
8		Lesson 12. Integration of rational fractions. Integration of irrational expressions Seminar 11 Seminar 12	
9		Lesson 13. Definite integral Lesson 14. Methods of calculating definite integral Seminar 13	
10		Lesson 15. Methods for approximating a definite integral Seminar 14 Seminar 15	
11		Lesson 16. Indefinite integrals Lesson 17. Multivariable functions Seminar 16	
12		Lesson 18. Gradient of a function in two variables Seminar 17 Seminar 18	
13		Lesson 19. Extremum of a bivariate function Lesson 20. Necessary and sufficient conditions for the extremum of a bivariate function Seminar 19	

14		Lesson 21. Number sequences Seminar 20 Seminar 21	
15		Lesson 22. Functional series Lesson 23. Abel's theorem. Power series decomposition of elementary functions Seminar 22	

Recommended Sources

TEXTBOOK(S)

1. M.Mərdanov, S.İsayeva, R.Aslanov. Ali riyaziyyat, Bakı, 2020.
2. R. Məmmədov, “Ali riyaziyyat kursu”, I hissə, Bakı, “Turan Evi” nəşriyyəti, 2013.
3. R. Məmmədov, “Ali riyaziyyat kursu”, II hissə, Bakı, “Turan Evi” nəşriyyəti, 2016.
4. В.С. Шипачев. «Высшая математика», Изд. Высшая школа, 2010.
5. В.А. Кудрявцев, Б.П. Демидович «Краткий курс высшей математики», М., Наука, 2001.
6. А.А. Гусак, Высшая математика: учебник для студентов вузов в 2-х томах, Минск, 2007, т.1
7. В.С. Шипачев. «Задачник по высшей математике», Изд. Высшая школа, 2010.
8. В.П. Минорский. «Сборник задач по высшей математике», М.: ФИЗМАТЛИТ, 2006.

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 Credit of the Course	**8**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Applied Mathematics
Course Unit Code	İF-BO3
Type of Course Unit	Compulsory
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	3
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:
Applied mathematics is a subject that focuses on the application of various branches of mathematics (e.g., statistics, probability, analysis, algebra, etc.) to practical problems. This subject teaches students how to apply various tools of mathematics to real-world problems. Applied mathematics problems are used in engineering, economics, natural sciences, and many other fields.

Objectives of the Course:
To introduce students to the application areas of mathematics.
To teach the construction and solution of mathematical models.
To prepare them to solve real-life problems with mathematical tools.
To understand the integration of mathematics with other fields and to apply it in these fields.

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	They have the ability to build mathematical models and apply these models to real-world problems.	1, 2
2	They can use mathematical tools to solve problems in statistics, probability theory, optimization, and other applied fields.	1, 2
3	They are able to solve mathematical problems using computer programs and other applied tools.	1, 2
4	They develop analytical thinking and problem-solving skills related to various applications of mathematics.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4

4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Elements of error theory. Absolute and relative error and their properties	
2		Seminar 1. Elements of error theory. Absolute and relative error and their properties	
3		LECTURE 2. Calculating the numerical value of a polynomial using the Horner scheme. Separating the roots of an equation	
4		Seminar 2. Calculating the numerical value of a polynomial using the Horner scheme. Separating the roots of an equation	
5		LECTURE 3. Solving nonlinear equations using simple iteration method	
6		Seminar 3. Solving nonlinear equations using simple iteration method	
7		LECTURE 4. Approximate solution of a system of linear equations using Cramer's rule	
8		Seminar 4. Approximate solution of a system of linear equations using Cramer's rule	
9		LECTURE 5. Approximate solution of a system of linear equations using Gauss's method	

10		Seminar 5. Approximate solution of a system of linear equations using Gauss's method	
11		LECTURE 6. Solving a system of linear equations using Seidel's method	
12		Seminar 6. Solving a system of linear equations using Seidel's method	
13		LECTURE 7. Approximation of a definite integral. Method of rectangles. Method of trapezoids. Simpson's method	
14		Seminar 7. Approximation of a definite integral. Method of rectangles. Method of trapezoids. Simpson's method	
15		LECTURE 8. Newton's 1st and 2nd interpolation formulas Seminar 8. Newton's 1st and 2nd interpolation formulas	

Recommended Sources

TEXTBOOK(S)

1. Н.В. Бурмашева, Е.Ю. Просвиряков, С.А. Берестова ИНЖЕНЕРНАЯ МАТЕМАТИКА, Учебная пособие, Екатеринбург, 2022

2. Н.И. Коршунова ПРИКЛАДНАЯ МАТЕМАТИКА ДЛЯ ЭКОНОМИСТОВ Учебное пособие для бакалавриата, МОСКВА, 2021

3. Е.В. Новак, Т.В. Рязанова, И.В. Новак ВЫСШАЯ МАТЕМАТИКА АЛГЕБРА Екатеринбург Издательство Уральского университета 2015

4. ALİ RİYAZİYYAT I hissə (Dərs vəsaiti), Bakı – 2012

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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

ECTS allocated based on Student Workload	
Total Workload	**120**
Total Workload/30(h)	**120/30**
ECTS Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Physics
Course Unit Code	İF-BO4
Type of Course Unit	Compulsory
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	0.66
Laboratory (hour/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

Objectives of the Course:
To instill in students the laws of electromagnetism, optics, atomic and nuclear physics. To introduce students to visual aids and do practical work throughout the course. To learn the connection of physics to life and to be able to apply it to various fields.

Learning Outcomes

	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.	1, 2
2	Important sections of the course program can be taken up for seminar classes.	1, 2
3	As a rule, seminars consider theoretical materials that require complex mathematical apparatus and various methods of solving problems.	1, 2
4	Students Students can receive various types of homework to consolidate the materials received in seminars.	1, 2
5	They will practically comprehend the subject by performing laboratory work	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4

4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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.** 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		**Lecture №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		**Lecture №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		**Lecture №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		**Lecture №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		**Lecture №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		**Lecture №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		**Lecture №8.** Steady electric current. Conditions for the occurrence of current. Ohm's law for a circuit part. Resistance of wires. Specific resistance. Series and parallel connection of wires. Coulomb-Lens law. Ohm's law for a complete circuit, E.H.Q	
9		**Lecture №9.** Structure and properties of solids. Theory of zones. Electric current in gases. Non-independent and independent discharges. Types of non-independent discharges. The phenomenon of thermoelectron emission	
10		**Lecture №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		**Lecture №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		**Lecture № 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		**Lecture №13.** Alternating current. Ohm's law for alternating current circuits. Transformers, principle of operation. Distribution and transmission of electrical energy over long distances	

14		**Lecture №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		**Lecture №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	
		Laboratory №1. Introduction to laboratory work. Understanding errors. Determining the acceleration of gravity using a mathematical dancer.	
		Laboratory №2. Coulomb potential and Coulomb field of metal surfaces, determination of the charge of a sphere. Calculation of the interaction force between charged particles	
		Laboratory №3. Determination of capacitance in a capacitor, dielectric constant of the medium	

Recommended Sources

TEXTBOOK(S)

1. Qocayev Niftalı Mehralı oğlu. Ümumi fizika kursu. IV cild (optika). [ali məktəblər üçün dərslik]. Bakı 2011.540 s.
2. R.M. Rzayev. Fizika,[ali məktəblər üçün dərslik]. Bakı 2015.736 s.
3. Əliyev Bayram Zeynal oğlu.Ümumi fizika kursu. Bakı, Elm,2010, 294s.
4. Əhmədov Faiq Abduləvvəl oğlu. Ümumi fizika kursu Ali məktəblət üçün dərs vəsaiti. Bakı, 2006, 348 s.
5. B.D. Əliyev, Q.T.Həsənov. Ümumi fizika kursu. Ali məktəblət üçün dərs vəsaiti. Bakı, 2004, 660 s.
6. Qocayev E.M., Səfərov N.Y. "Tətbiqi fizika"Bakı "AzTU "2018, 393 s..
7. Q.T. Həsənov, Ə.Ə. Əliyev.Ümumi fizika kursu. . [ali məktəblər üçün dərslik]. Bakı 2015. 440 s.
8. M.Murğuzov,A.Ələkbərov,O.Həsənov.Ümumi fizika kursu. [ali məktəblər üçün dərslik]. Bakı 2011-322 s.
9. Eyvazov E.Ə, Fərəcov V.C,Qurbanov S.S " Yarımkeçiricilər fizikasına giriş" Bakı "Çinar çap " 2007,392 s.
10. Eyvazov E.Ə " Bərk cisimlər fizikası" Bakı " Təhsil" 2003,455s
11. Həsənov İ.S "Plazma və dəstə texnologiyası" Bakı "Elm" 2007 ,171s.
12. Ə.Ş. Abdinov,İ.S. Həsənov,T.X. Hüseynov " Elektron ciha zları və emissiya elektronikasının əsasları" Bakı 2011,358 s.

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)	**150/30**
ECTS Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Fundamentals of Mechatronics and Robotics
Course Unit Code	İF-BO5
Type of Course Unit	Compulsory

Level of Course Unit	2^{nd} year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	3
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Rustamova Durdana Farhad
Name of Lecturer (s)	Rustamova Du.0rdana 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 “Fundamentals of Mechatronics and Robotics” provides information about the application of technology in the fields of electronics, computer applications, programming, and at the same time the rapid development of automation in industrial fields, the creation of intelligent devices and robots and their application in many industrial fields, etc. The necessity of using mechatronic systems in modern production technologies, electric vehicles, scientific research, for example, in the study of the ocean floor, space - the Moon, Mars, is justified. Due to their harmfulness to human health, inaccessibility and complexity, especially in cases where it is impossible for a person to come into contact with research objects, robots-mechatronic systems are widely used in many industrial facilities, for example, in atomic reactors, chemical reactors, and in the detection and destruction of mines. The goal is to introduce the role of the subject "Fundamentals of Mechatronics and Robotics" in science, technology, industry and other fields, to ensure the scientific and methodological preparation of future specialists, to form in them the relevant knowledge, skills and habits for implementing education, to familiarize them with the experience gained in teaching the subject "Fundamentals of Mechatronics and Robotics", and to form the ability to think logically.

Objectives of the Course:
Ensuring the scientific and methodological preparation of future specialists, forming in them the relevant knowledge, skills and habits for implementing teaching, familiarizing them with the experience gained in teaching the basics of mechatronics and robotics, 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 Fundamentals of Mechatronics and Robotics as a science, scientific research methods, and its relationship with other sciences	1, 2
2	Formation of ideas about the forms of organizing the training of Fundamentals of Mechatronics and Robotics	1, 2
3	Formation of ideas about the means of training of Fundamentals of Mechatronics and Robotics	1, 2
4	Formation of ideas about the principles and training methods of training of Fundamentals of Mechatronics and Robotics	1, 2
5	Formation of ideas about the goals and objectives of training of Fundamentals of Mechatronics and Robotics for undergraduate students	1, 2
6	Performance of practical tasks used in the training of Fundamentals of Mechatronics and Robotics for undergraduate students	1, 2
7	Control and investigation of the level of performance of practical tasks	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim	4

	of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Current status of the mechatronics and robotics engineering specialty Status of methods and tools for intelligent control for mobile robots Seminar 1	
2		Lecture 2. Interaction of science in the field with other sciences Seminar 2	
3		Lecture 3. Information exchange. Signal classification Signal processing parameters Seminar 3	
4		Lecture 4. Image parameters Seminar 4	
5		Lecture 5. Color Triangle Lecture 6. Color Chart. Color Collection Seminar 5	
6		Lecture 7. Intelligent robot Seminar 6	
7		Lecture 8. Increasing the Sensing Power of Robots Lecture 9. Increasing the Intelligence of Robots Seminar 7	
8		Lecture 10. A systematic approach to the design of mechatronic systems Seminar 8	
9		Lecture 11. Stages of the design of mechatronic systems Seminar 9	
10		Lecture 12. Design systems Seminar 10	
11		Lecture 13. Basic principles of design Lecture 14. Structure of automated design systems Seminar 11	
12		Lecture 15. Types of automated design systems Seminar 12	

13		Lecture 16. Designing based on group technology Lecture 17. Mathematical modeling Seminar 13	
14		Lecture 18. Imitation modeling Seminar 14	
15		Lecture 19. Classification of Digital Filters in Information Exchange Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Артемьева Т.В. Гидравлика, гидромашины и гидропневмопривод: Учебник / Т.В. Артемьева, Т.М. Лысенко, А.Н. Румянцева, С.П. Стесин. – М.: Академия, 2014. – 352 с.

2. Богданов М.Р. Применения GPS/ГЛОНАСС: учеб. пособие/М.Р. Богданов. - МО., ИД «Интеллект». 2012. – 136 с.

3. Шахворостов С.А. Основы автоматизации: учебн. пособие/ С.А. Шахворостов. – М.: МАДИ, 2004. - 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	**180**
Total Workload/30(h)	**180/30**
ECTS Credit of the Course	**6**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Theoretical Mechanics
Course Unit Code	İF-BO6
Type of Course Unit	Compulsory
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	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 need to study "Theoretical Mechanics" arises from the requirements of the development of modern technology. A number of disciplines dealing with the theory and calculation of various devices and machines, for example, the strength of materials, machine parts, the theory of machines and mechanisms, construction mechanics, etc., are based on the provisions of theoretical mechanics. Therefore, the role of theoretical mechanics in the training of highly qualified specialists with comprehensive training, excellent knowledge, and the emergence of new technologies in the future, in connection with scientific and technological progress, is indispensable.		
Objectives of the Course: "Theoretical Mechanics" is Providing scientific and methodological training of future specialists (goals and content of theoretical mechanics education, forms of organization of training, methods and means, modern training technologies), forming in them relevant knowledge, skills and habits for the implementation of training, familiarizing them with the accumulated experience in teaching, 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 subject and purpose of the discipline of theoretical mechanics	1, 2
2	Acquiring knowledge about the 3 sections of theoretical mechanics	1, 2
3	Study of the concepts of theoretical mechanics	1, 2
4	Study of the concepts of statics and force	1, 2
5	Learning the analytical equilibrium conditions of a system of forces applied at a point	1, 2
6	Formation of ideas about the moment of force and its determination, analytical conditions of a system of forces	1, 2
7	Kinematics section - kinematics of a rigid body and point, formation of ideas about the rules for finding velocity and acceleration when given the types of methods of conveying the motion of a point	1, 2
8	Dynamics section - formation of ideas about the dynamics of a material point, the dynamics of a system of material points	1, 2
9	Study of the theory of impact.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5

3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Solving the problem of equilibrium of a system of forces applied at a point Seminar 1	
2		Lecture 2. Solution of the problem of equilibrium of a system of plane parallel forces Seminar 2	
3		Lecture 3. Solution of the problem of equilibrium of an arbitrary plane system of forces Seminar 3	
4		Lecture 4. Solution of the problem of equilibrium of a system of space parallel forces. Solving the problem of equilibrium of an arbitrary space system of forces Seminar 4	
5		Lecture 5. Solution of the problem of finding the trajectory of motion of a point Seminar 5	

6		Lecture 6. Solving the speed and acceleration of the motion of a point Seminar 6	
7		Lecture 7. Solution of the problem of rotational motion of a rigid body and finding the speeds and accelerations of the body in this motion Seminar 7	
8		Lecture 8. Calculation of trusses Seminar 8	
9		Lecture 9. Examples of finding the friction force. Seminar 9	
10		Lecture 10. Solving the problem of finding the velocity and acceleration of a plane figure Seminar 10	
11		Lecture 11. Solving the problem of finding the velocity and acceleration of a point in its complex motion Seminar 11	
12		Lecture 12. The center of instantaneous velocities of a plane figure and its position in special cases Seminar 12	
13		Lecture 13. Finding the accelerations of points on a plane figure. The center of instantaneous accelerations of a plane figure Seminar 13	
14		Lecture 14. Complex motion of a point. Finding the velocities and accelerations of a complex moving point. Coriolis acceleration Seminar 14	
15		Lecture 15. Solving the problem of dynamics Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Qədirov N.B. Nəzəri mexanika kursu, Ali məktəblər üçün dərslik. Bakı, 1997
2. Qədirov N.B. Nəzəri mexanika kursu, Ali məktəblər üçün dərslik. Bakı, 1997
3. Knyaz Əliyev. Nəzəri mexanikadan mühazirələr. Bakı 2013
4. Vasıle Szolga Theoretıcal Mechanıcs Lecture Notes and Sample Problems
5. Quliyev S.Ə., Eyvazov E.B. Nəzəri mexanika. Bakı, 2003, 391 s.

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 Credit of the Course	**6**

Mechatronics and Robotics Engineering bachelor program, Department of "Programming and Information Security"

Course Unit Title	Fundamentals of Programming
Course Unit Code	İF-BO7
Type of Course Unit	Compulsory
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	7

Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Gahramanli T.B.
Name of Lecturer (s)	Gahramanli T.B.
Name of Assistant (s)	-
Mode of Delivery	Face to Face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
"Basics of Programming" course Programming is a branch of computer science that studies the methods and construction methods, properties of algorithms. Algorithmization of a problem means the development of an algorithm for solving a problem using a computer. An algorithm is a sequence of finite number of operations performed to achieve a set goal. To solve a problem on a computer, the algorithm for solving this problem must be written in the form of a program.

Objectives of the Course:
The course on the basics of programming widely involves learning and using modern technical tools. Therefore, future specialists studying in relevant areas 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 "Fundamentals of Programming", scientific research methods, and its relationship with other sciences	1, 2
2	Formation of ideas about the forms of organizing the training "Fundamentals of Programming"	1, 2
3	Formation of ideas about the means of training "Fundamentals of Programming"	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL

1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	3
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	3
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	3
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Computer software. Basic concepts and principles of programming. Classification of programming languages Seminar 1	
2		Lesson 2. Data, data types. Operations. Expressions Seminar 2	
3		Lesson 3. Basic constructions of algorithms. Construction of linear algorithms and block diagrams Seminar 3	
4		Lesson 4. Basic elements of algorithmic languages Seminar 4	
5		Lesson 5. Input and output of data. Assignment operator. Standard input and output procedures. Structure of a C++ program. Console extensions Sections of a C++ program. Descriptions section. Operators section. Connection of modules, description of symbols,	

		constants, types, variables, description of procedures and functions Seminar 5	
6		Lesson 6. General form of the if operator. Abbreviated form of the if operator. Using the nested if operator Seminar 6	
7		Lesson 7. Compound operator. Selection (variant) operator. User types. Loop operators. Nested loops. Parameterized loop operator for. Its general form Seminar 7	
8		Lesson 8. Subroutines. Standard procedures and functions. Subroutine concept Seminar 8	
9		Lesson 9. Types of subroutines. Procedures. Functions. Comparison of procedures and functions Seminar 9	
10		Lesson 10. Creating modules, subroutine libraries. Module concept Seminar 10	
11		Lesson 11. Module structure. Interface part of the module, the necessary implementation part. Files. File base. Types of files. Text files Seminar 11	
12		Lesson 12. Typed files. Untyped files. File declaration. Standard procedures and functions related to files Seminar 12	
13		Lesson 13. Object-oriented programming. Classes, objects, properties, events, methods. Components. C++ system. Creating programs in the C++ environment Seminar 13	
14		Lesson 14. Features of the C++ system Seminar 14	
15		Lesson 15. An integrated C++ environment for developing programs. Creating, editing, debugging, saving and loading applications in the C++ system Seminar 15	

Recommended Sources TEXTBOOK(S)

1. Александров В.В., Маскин С.С., Матюхин В.В., Рашид А., Сигаев С.М., Бирюлев Д.С. Стандартизация лечебно-диагностического алгоритма у пациентов с закрытой травмой живота и нестабильной гемодинамикой // Университетская клиника. 2022. № S1. С. 15-16. Ремизова О.И., Алгоритмизация и программирование (С++), МИСиС, 2021
2. Xəlilov M. İnformatika. Bakı, 2009.
3. İbrahim-zadə T., Sərdarov Y. Kompüter şəbəkələrinin əsasları və proqram təminatı. Bakı, 2008.
4. “İNFORMATİKA” M. Əlizadə, M. Salmanova, X. Abbasva, M.Orucova, E.Seyidzadə, dərslik, Bakı 2015
5. Грибанов В.П., Калмыкова О.В., Сорока Р.И. Основы алгоритмизации и программирования, М., Изд.центр ЕАОИ.-2008.

6. Семакин И.Г., Шестаков А. П. Основы алгоритмизации и программирования.-М. : Изд-во «Академия» 2008 г.
7. Кутузов М., Преображенский А. Выбор и модернизация компьютера: Анатомия ПК., Питер, 2004 г., 320с.
8. Крымов Б. Диагностика ПК с нуля! + CD. Лучшие книги, 2006 г., 268с.
9. Соломенчук В.Г., Соломенчук П.В. Железо ПК 2007.БХВ-Петербург, 2007 г., 496с.
10. Тюнин Н.А. ЖК мониторы: приложение к журналу "Ремонт и Сервис".

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 Credit of the Course	**7**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Theory of Machines and Mechanisms
Course Unit Code	İF-BO8
Type of Course Unit	Compulsory
Level of Course Unit	2^{nd} year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	3
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	3
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:
Material resistance is a science that deals with the general rules of mechanical motion and equilibrium of material bodies. Theoretical mechanics, which is taught in higher technical schools, is divided into 3 sections. In the statics section of theoretical mechanics, the rules for replacing a given system of forces with an equivalent system and the conditions for equilibrium of bodies are studied. In the kinematics section, the mechanical motion of bodies is studied from a geometric point of view. Kinematics is the basis for the study of dynamics, and in addition, kinematics itself has an independent application. The dynamics section is the most important part of the Theoretical Mechanics course and is of exceptional importance for solving a number of problems in modern technology. Dynamics plays a major role in the development of such important and advanced scientific and technical fields as modern machines and mechanisms, rocket technology, space flights, etc.

Objectives of the Course: Ensuring the scientific and methodological preparation of future specialists (purpose and content of training in the strength of materials, forms of organization of training, methods and means, modern training technologies), forming in them the relevant knowledge, skills and habits for implementing training, familiarizing them with the accumulated experience in teaching the subject of strength of materials, and forming the ability to think logically.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Will be able to explain basic concepts – Will understand the basic elements, concepts and classification of machines and mechanisms	1, 2
2	Will be able to perform kinematic analysis – Will be able to calculate the motion and speed of various mechanisms by performing kinematic analysis.	1, 2
3	Will have the ability to perform dynamic analysis – Will be able to calculate the dynamic loading, forces and moments of mechanisms.	1, 2
4	Will be able to design machines and mechanisms – Will carry out the design and optimization of various machines and mechanisms	1, 2
5	Will be able to apply the acquired knowledge to practical problems – Will be able to evaluate the application of mechanisms in automobiles, robotics, production equipment and other fields	1, 2
6	Will be able to use software and simulation tools – Will use computer programs (CAD/CAM, simulation programs, etc.) for kinematic and dynamic analyses	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5

7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Basic concepts Seminar 1	
2		Lecture 2. Kinematic pairs and their types (classes) S eminar 2	
3		Lecture 3. Kinematic chains Seminar 3	
4		Lecture 4. Degrees of freedom of spatial mechanisms Seminar 4	
5		Lecture 5. Principle of creating mechanisms. Assyrian group Seminar 5	
6		Lecture 6. Classification of mechanisms. Replacement of higher kinematic pairs with elementary pairs in mechanisms Seminar 6	
7		Lecture 7. Kinematic study of flat mechanisms with elementary kinematic pairs Seminar 7	
8		Lecture 8. Basic equations for determining speed and acceleration Seminar 8	
9		Lecture 9. Construction of a velocity plan of a four-link mechanism with a hinge Seminar 9	
10		Lecture 10. Construction of a velocity plan of a crank-slider mechanism Seminar 10	
11		Lecture 11. Construction of a velocity plan of a four-link mechanism with a hinge Seminar 11	

12		Lecture 12. Construction of a velocity plan of a crank-slider mechanism Seminar 12	
13		Lecture 13. Shafts and axles Seminar 13	
14		Lecture 14. Construction of a velocity plan of a link mechanism Seminar 14	
15		Lecture 15. Construction of a velocity plan of a link mechanism Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Kəngərli A.M. Maşın və mexanizmlər nəzəriyyəsi. Baki, “Müəllim”, 2004, 674 s.
2. Kərimov S.X, Həşimov E.Q., Həsənov Q.E., “Maşın və mexanizmlər nəzəriyyəsi kursu”, Bakı, 2012
3. Xəlilov Ə.M. Tətbiqi mexanika. Baki, “Təhsil”, 2008, 527 s.

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 Credit of the Course	**6**

Mechatronics and Robotics Engineering bachelor program, Department of "Programming and Information Security"

Course Unit Title	Data Structure and Algorithms
Course Unit Code	IF-B09
Type of Course Unit	Compulsory
Level of Course Unit	2
National Credits	
Number of ECTS Credits Allocated	7
Theoretical (hour/week)	3
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Bagırova Vafa Vaqif
Name of Lecturer (s)	Bagırova Vafa Vaqif
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.		
Objectives of the Course: 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 Intelligence	1, 2
2	Predicting future values through data analysis	1, 2
3	Becoming a data analytics expert	1, 2
4	Acquiring basic and intermediate knowledge in data science	1, 2
5	Developing Practical Skills	1, 2
6	Introducing Modern Technologies	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	3
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	3
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3

8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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, Outlier Detection and Removal	
3		Lecture 3. Basic Statistical Indicators and General Analysis of Data	
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, C. M. (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	**210**
Total Workload/30(h)	**210/30**
ECTS Credit of the Course	**7**

Mechatronics and Robotics Engineering bachelor program, Department of "Programming and Information Security"

Course Unit Title	Database System
Course Unit Code	İF-B10
Type of Course Unit	Compulsory
Level of Course Unit	3
National Credits	
Number of ECTS Credits Allocated	7
Theoretical (hour/week)	4
Practice (hour/week)	2
Laboratory (hour/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.

Objectives of the Course:
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 a database;	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 security and data recovery strategies in the database.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	4
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	3
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	3
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	3
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	3
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	3
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Transaction management and	
5		Lecture 5. Evolution of data models	
6		Lecture 6. Database design and ER model: 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 constraints	
12		Lecture 12. Views: access to views, data independence, security view updates, Table and view comparisons	
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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Mechatronic and Robotic Systems Design
Course Unit Code	İF-B11
Type of Course Unit	Compulsory
Level of Course Unit	2^{nd} year
National Credits	

Number of ECTS Credits Allocated	8
Theoretical (hour/week)	3
Practice (hour/week)	3
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	4
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 “Design of Mechatronics and Robotics Systems” provides information about the application of technology in the fields of electronics, computer applications, programming, and at the same time the rapid development of automation in industrial fields, the creation of intelligent devices and robots and their application in many industrial fields, etc. The necessity of using mechatronic systems in modern production technologies, electric vehicles, scientific research, for example, in the study of the ocean floor, space - the Moon, Mars, is justified. Due to their harmfulness to human health, inaccessibility and complexity, especially in cases where it is impossible for a person to come into contact with research objects, robots-mechatronic systems are widely used in many industrial facilities, for example, in atomic reactors, chemical reactors, and in the detection and destruction of mines. The goal is to familiarize students with the role of the subject "Design of Mechatronics and Robotics Systems" in science, technology, industry and other fields, to ensure the scientific and methodological preparation of future specialists, to form in them the relevant knowledge, skills and habits for implementing teaching, to familiarize them with the experience gained in teaching the subject "Design of Mechatronics and Robotics Systems", and to form the ability to think logically.

Objectives of the Course:
Ensuring the scientific and methodological preparation of future specialists, forming in them the relevant knowledge, skills and habits for implementing education, introducing them to the experience gained in teaching the subject of mechatronics and robotics systems design, 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 mechatronics and robotics systems design as a science, scientific research methods, and its relationship with other sciences	1, 2
2	Formation of ideas about the forms of organizing training in mechatronics and robotics systems design	1, 2
3	Formation of ideas about the means of training in mechatronics and robotics systems design	1, 2
4	Formation of ideas about the principles and training methods of training in mechatronics and robotics systems design	1, 2
5	Formation of ideas about the goals and objectives of training in mechatronics and robotics systems design for undergraduate students	1, 2
6	Performance of practical tasks used in the training of the course in mechatronics and robotics systems design for undergraduate students	1, 2
7	Control and investigation of the level of performance of practical tasks	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4

10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Components of mechatronic systems. Classification of robot motion Lecture 2. Basics of design. Robotic design capabilities Seminar 1	
2		Lecture 3. Theoretical foundations of mechatronic systems design Seminar 2 Seminar 3	
3		Lecture 4. Technical design. Basic approaches to the design process Lecture 5. Design Technical assignment. Preliminary design stage Seminar 4	
4		Lecture 6. Sketch design. Technical design. Basic design principles Seminar 5 Seminar 6	
5		Lecture 7. The main goals and methods of project automation Strategic design Seminar 7	
6		Lecture 8. Computer Aided Design Systems Seminar 8 Seminar 9	
7		Lecture 9. Types of CAD software. A collection of mathematical programs Lecture 10. Software (SW) - a collection of machine programs Seminar 10	
8		Lecture 11. Linguistic support. Design languages Management	

		languages Seminar 11 Seminar 12	
9		Lecture 12. Process control command generation Lecture 13. CAD modeling tools Seminar 13	
10		Lecture 14. Geometric Modeling. Skeleton modeling Seminar 14 Seminar 15	
11		Lecture 15. Surface modeling. Parametric modeling. Hierarchical parameterization Lecture 16. Variational (dimensional) parameterization. Geometric parameterization Seminar 16	
12		Lecture 17. Associative design Seminar 17 Seminar 18	
13		Lecture 18. Object-oriented design. A systematic approach to the design of mechatronic systems Lecture 19. Stages of mechatronic system design Seminar 19	
14		Lecture 20. Preparation stage for designing mechatronic systems Designing systems. Basic principles of design Seminar 20 Seminar 21	
15		Lecture 21. Automated design systems - structure and types Lecture 22. Design of robots based on group technology Seminar 22	

Recommended Sources

TEXTBOOK(S)

1. Mayılov Valeh Bayram oğlu, İntellektual Sistemlər Və Texnologiyalar, Bakı-2016
2. Винер Н. Кибернетика. - М.: Сов. радио, 1968
3. Гутштейн А.И. Кибернетика в экономическом регулировании производства. М., Экономика, 1972.
4. Е.И. Юревич Основы Робототехники
5. А.Н. Радченко. Ассоциативная память. Нейронные сети. Оптимизация нейропроцессоров. Санкт-Петербург. Наука, 1998.

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

Course Policies

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

ECTS allocated based on Student Workload

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

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Electronics
Course Unit Code	İF-B12
Type of Course Unit	Compulsory
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	4
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 development in all areas of computer 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. Electronic devices play a major role in increasing the reliability of electrical systems. Electronics play an indispensable role in the use of alternative energy sources, especially solar and wind energy.

Objectives of the Course: The goal and main objective of teaching the subject is to provide future specialists with relevant knowledge about "Electronics" 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		Assessment
1	Semiconductor devices and physical processes occurring in them	1, 2
2	Diodes and transistors, physical processes occurring in them and their areas of application	1, 2
3	Semiconductor rectifiers. Single-phase and three-phase rectifiers. Smoothing filters	1, 2
4	Electrical signal amplifiers, their types and areas of application	1, 2
5	Harmonic oscillators. LC – autogenerators, RC – autogenerators	1, 2
6	Pulse signal generators, triggers, multivibrators	1, 2
7	Digital electronic and microelectronic devices.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4

8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. General information about semiconductor materials. Specific and additive conductors. Concentration of charge carriers in semiconductors Seminar 1	
2		Lesson 2. Electrical conductivity of semiconductors. Diffusion and drift currents in semiconductors Seminar 2	
3		Lesson 3. Metal-semiconductor contact. p–n junction. Classification of semiconductor diodes Seminar 3	
4		Lesson 4. Rectifier diodes Seminar 4	
5		Lesson 5. Bipolar transistors. Operating modes of a bipolar transistor. Unipolar transistors Seminar 5	
6		Lesson 6. Thyristors Seminar 6	
7		Lesson 7. Optical and photoelectric properties of semiconductors. Semiconductor light-emitting diodes Seminar 7	
8		Lesson 8. Technological foundations of microelectronics Seminar 8	

9		Lesson 9. Classification of integrated circuits. Amplifiers. Classification of amplifiers Seminar 9	
10		Lesson 10. Operational amplifiers Seminar 10	
11		Lesson 11. Electronic switch circuits. Bipolar transistor switch circuit. Logic elements Seminar 11	
12		Lesson 12. Bipolar transistor logic elements Seminar 12	
13		Lesson 13. Triggers. Power sources for electronic devices Seminar 13	
14		Lesson 14. Single-phase rectifiers Seminar 14	
15		Lesson 15. General information about three-phase and polyphase rectifiers. Smoothing filters Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. R.T. Humbətov, Elektronika. I hissə, Maarif nəşriyyatı, Bakı, 2002.
2. R.T. Humbətov, Elektronika. II hissə, Maarif nəşriyyatı, Bakı, 2010.
3. M.N. Yolçuyev, N.S. Axundov. Elektrotexnika və Elektronika. MBM nəşriyyatı, Bakı, 2012.
4. Ю.С. Забродин. Промышленная электроника. Издательство "Высшая школа", Москва, 1982.

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 Credit of the Course	**6**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Robotics Control
Course Unit Code	İF-B13
Type of Course Unit	Compulsory
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/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:
Today, the development of science and technology has reached such a level that management processes in various fields are carried out with the help of highly computerized, robotic equipment, which in turn requires highly qualified personnel training. In order to achieve certain goals, we are faced with the need to plan various management activities, perform operations, and perform actions in our daily activities. For this purpose, it is appropriate to teach the subject of "Robot Control", which covers the general laws, principles, and theoretical provisions of the robotization of various technological processes and their management, and to impart knowledge in this field to students.

Objectives of the Course:
The purpose of the subject is the robotization of technological processes of various nature, the structure of their control systems, the analysis of characteristics, the determination of appropriate mathematical models, and computer modeling of control systems of technical processes. Students who have mastered this subject should have general knowledge about mechatronic systems (MS) and be able to distinguish robotic-mechatronic systems, in addition, students should be able to synthesize a mechatronic system, for example, a control module, and model it on a computer.

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 robotic systems control as a science, scientific research methods, and its relationship with other sciences	1, 2
2	Formation of ideas about the forms of organizing training in the control of robotic systems	1, 2
3	Formation of ideas about the means of training in the control of robotic systems	1, 2
4	Formation of ideas about the principles and training methods of robotic system control training	1, 2
5	Formation of ideas about the goals and objectives of robotic systems control training for undergraduate students	1, 2
6	Performing practical tasks used in the training of undergraduate students in the	1, 2

	robotics systems control course	
7	Monitoring and investigating the level of performance of practical tasks	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Robot architecture. Robot hardware and software Seminar 1	

2		Principles and methods of robot control Seminar 2	
3		Reactive and reflective management methods Seminar 3	
4		Combined and behavioral management methods Seminar 4	
5		Necessary calculations for robot kinematics and control problems Seminar 5	
6		Control systems. Open and closed systems Seminar 6	
7		PID controllers Seminar 7	
8		Control of a four-degree-of-freedom robotic arm with DOF PID Seminar 8	
9		Programmable Logic Controllers and Robot Control Based on Them Seminar 9	
10		PLC-based control system for a robotic arm with SWEDISH mechanism Seminar 10	
11		FPGA-based robotic arm control systems Seminar 11	
12		Direction and attitude electronic control systems in mobile robots Seminar 12	
13		Designing control circuits based on digital techniques Seminar 13	
14		Digital control circuit of a linear robot Seminar 14	
15		Position control of an obstacle avoidance robot using the Karnaugh diagram method Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Əliyev R.Ə., Cəfərov S.M., Babayev M.C. və digər. «Robototexniki sistemlərdə idarəetmə»Bakı, Nərgiz, 2004, 328s.

2. Подураев Ю.В. «Основы мехатроники». Москва “Станки” 2000, 104s

3. Алферов Г.В., Кулаков Ф.М., Нечаев А.И., Чернякова С.Э. «Информационные системы внутренней реальности в мехатронике и робототехнике» Санкт-Петербург 2007, 142s.

4. Зенкевич С.Л., Ющенко А.С. «Управление роботами» МГУ им.Баумана, 2000 – 400s.

5. Манульский И.И., Замятой В.П., Майоров Ю.П. и др. «Робототехнические системы икомплексы» Москва, Транспорт, 1999, 446s.

6. ФуК, Гонсалес Р., ЛиК «Робототехника» Москва, Мир, 1989, 624s.

7. Подураев Ю.В. «Мехатроника. Основы, Методы, Применения Для вузов», Москва, Машиностроение, 2007, 256s.

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 Credit of the Course	**6**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Modeling and Simulation of Dynamic Systems
Course Unit Code	İF-B14
Type of Course Unit	Compulsory
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	6
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 "Modeling and Simulation of Dynamic Systems" belongs to the block of general technical subjects. "Modeling and Simulation of Dynamic Systems" is one of the important subjects of the Mechatronics and Robotics Engineering specialty. This subject provides an understanding of the basic provisions of simulation theory, the main modeling methods of continuous, discrete event and agent systems, the basic principles of system dynamics, and the features of building stochastic models. At the same time, they will be able to study in detail the issues of improving the quality and achieving the required results during the operation of robots.
Objectives of the Course: The main goal of the subject is to master the basic principles of simulation theory, the main modeling methods of continuous, discrete event and agent systems, the basic principles of system dynamics, and the features of building stochastic models. The aim is to form the relevant knowledge, skills and habits in students, to ensure the scientific and methodological preparation of future specialists, and to instill in them the ability to model and simulate dynamic systems.

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 "Modeling and Simulation of Dynamic Systems" as a science, its relationship with other sciences	1, 2
2	Study of the management structure of production processes of modeling and simulation of dynamic systems and mastery of modern technology	1, 2
3	Performance of practical tasks used in the training of the course "Modeling and Simulation of Dynamic Systems" for students studying at the sub-bachelor's level	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5

6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Introduction. Basic concepts and provisions. Mathematical model and object modeling. Environmental study Seminar 1	
2		Classification of models. Classification based on the time factor. Classification based on the area of use. Classification based on the method of presentation Seminar 2	
3		Requirements for models. Basic stages of modeling, Simulation or imitation modeling Seminar 3	
4		Classification of mathematical models. Deterministic, stochastic, fuzzy and interval-uncertainty mathematical models Seminar 4	
5		Dynamic systems, dynamic models Seminar 5	
6		Models of classical mathematical physics, mechanics, electrodynamics and quantum mechanics Seminar 6	

7		General scheme of mathematical modeling. Model construction and its study and the main stages of modeling, from the point of view of science and art Seminar 7	
8		Abstract and Real Mathematical Theories of Dynamical Systems A brief overview of the current state of the foundations of dynamical systems theory. Seminar 8	
9		Signal analysis. Issues of technical implementation of processing. Basic concepts and provisions. Energy and power of signals. Classification of signals Seminar 9	
10		Deterministic signals. Finite-term signal. Single impulse signal. Single impulse signal. Harmonic signal Seminar 10	
11		Random Signals Seminar 11	
12		Modeling dynamic objects using differential equations. Forms of writing differential equations Seminar 12	
13		Dynamics equation Seminar 13	
14		Statics Equation Seminar 14	
15		Simulation of control objects, Vector modeling of control objects Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Q.Ə. Rüstəmov, Riyazi modelləşdirmə və Simulyasiya. Dərs vəsaiti. Bakı-AzTU, 2015. – 120 s

2. İbrahimov B. Q. Siqnalların rəqəmli emalı. Tempus. Bakı, AzTU, 2003, 135 s.

3. Неймарк Ю.И. Н 45 Математическое моделирование как наука и искусство: Учебник. – 2-е изд., испр. и доп. – Н. Новгород: Изд-во Нижегородского госуниверситета, 2010. – 420 с.

4. Rüstəmov Q.Ə. Avtomatik tənzimləmə nəzəriyyəsi: Matlab-Simulinkdə modelləşdirmə. Dərslik. Bakı, AzTU, 2012, 750 s.

5. Thakaa Abd Saleh “Mathematical Modeling and Simulation” of the Composting Process & Municipal Solid Waste Evaluation at Baghdad City, Publisher: LAP LAMBERT Academic Publishing 2017, 160 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 Credit of the Course	**6**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Theory of Automatic Control
Course Unit Code	İF-B15
Type of Course Unit	Compulsory
Level of Course Unit	4^{th} year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/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 “Theory of Automatic Control” provides information about the fact that any work is not done by a person, but is a process that is self-regulated, uses technical means and is based on mathematical methods, the rapid development of automation in industrial fields, the application of automation in many industrial fields, etc. The importance and effectiveness of automation in any subject related to human practical activity, scientific research and design procedures, communication systems, continuous production, mechanical engineering, oil and gas, mining, etc. justify the teaching of the subject. The main requirements for automation facilities are the possibility of full control over the processes taking place in these facilities and their management. Automation allows you to increase labor productivity, improve product quality, optimize management processes, and protect people from production hazardous to health. The goal is to familiarize students with the role of the subject "Theory of Automatic Control" in science, technology, industry and other fields, to ensure the scientific and methodological preparation of future specialists, to form in them the relevant knowledge, skills and habits for implementing teaching, to familiarize them with the experience gained in teaching the subject "Theory of Automatic Control", and to form the ability to think logically.		
Objectives of the Course: The main task of teaching the subject "Theory of Automatic Control" is to teach students studying at the bachelor's level in the specialty "Mechatronics and Robotics Engineering" methods and tools for automating processes in mechanical engineering, as well as control in automated systems.		
Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	To know the principles of building automatic control systems	1, 2
2	To understand the basic concept of industrial and production automation	1, 2
3	To form an idea about the goals and objectives of training in production process control for undergraduate students	1, 2
4	To monitor and investigate the level of performance of practical tasks.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course’s Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5

5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Introduction. Automation and production process automation Seminar 1	
2		Classification of automatic systems Seminar 2	
3		Generalized structural scheme of information reception in automatic systems Seminar 3	
4		Parametric transducers: contact, rheostat, strain gauges, photoelectric, inductive and capacitive transducers Seminar 4	
5		Generator-type transmitters: thermoelectric, piezoelectric, tachometric transmitters Seminar 5	
6		Intermediate connecting elements. Measurement schemes: bridge, differential and compensation measurement schemes Seminar 6	
7		Amplifiers	

		Seminar 7	
8		Executive elements and devices Seminar 8	
9		Element base of automated digital systems Seminar 9	
10		Basic Elements of Digital Technique Seminar 10	
11		Sequential and combinatorial digital devices Seminar 11	
12		Types of automatic control systems Seminar 12	
13		Mathematical notation of automatic control systems Seminar 13	
14		Application of Programmable Logic Controllers in Automation Seminar 14	
15		PMK structure, inputs and outputs, programming Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Маммадов Щ.Я., Намазов М.Б., Ящмядов Р.М. Автоматлашдырманын ясаслары. Бакы: 2009

2. Маммадов Щ.Я., Яфяндийев О.З. Автоматика вя истеhсал просесляринин автоматлашдырылмасы. Бакы, 1992

3. Маммадов Щ.Я., Əhmədov R.M. İdarəetmə sistemlərinin element və qurğuları, Bakı:2006

4. Рустямов Г.Я. Автоматик тянзимлямя нязярийййяси. Бакы, Насир няшр., 2003; 2006.

5. Рустямов Г.Я., Фярщадов В.Г., Рцстямов Р.Г. Автоматик идаряетмя нязярийййясиндян Матлаб/Симулинкдя йериня йетирилян лабораторийа ишляри. Бакы, 2012, 140с.

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 Credit of the Course	**6**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Digital Signal and Image Processing
Course Unit Code	İF-B16
Type of Course Unit	Compulsory
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	7

Theoretical (hour/week)	3
Practice (hour/week)	3
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	6
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 “Digital Signal and Image Processing” provides information about the application of technology in the fields of electronics, computer applications, programming, and at the same time the rapid development of automation in industrial fields, the creation of intelligent devices and robots and their application in many industrial fields, etc.
Formation of relevant knowledge, skills and habits in students, ensuring their work preparation in the field of mechatronics and robotics.

Objectives of the Course:
The goal is to introduce the role of the subject "Processing of Digital Signals and Images" in science, technology, industry and other fields, to ensure the scientific and methodological preparation of future specialists, to form in them the relevant knowledge, skills and habits for implementing teaching, to familiarize them with the experience gained in teaching the subject "Processing of Digital Signals and Images", and to form the ability to think logically.

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	Signals and their properties	1, 2
2	Image parameters. Image analysis and synthesis	1, 2
3	Fundamentals of color theory	1, 2
4	Quantization	1, 2
5	Discretization	1, 2
6	Numerical operations	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Signals and their properties Determining the correct value of the measured parameter Seminar 1	

2		Image parameters. Image analysis and synthesis Seminar 2 Seminar 3	
3		Basics of Color Theory Color Chart Seminar 4	
4		Color addition, brightness equation Seminar 5 Seminar 6	
5		Quantization Discretization. Kotelnikov (Nyquist, Shannon) theorem Seminar 7	
6		Linear systems. Requirements for linearity Seminar 8 Seminar 9	
7		Stationarity and sinusoidal accuracy Special properties of linearity Seminar 10	
8		Main types of decomposition Seminar 11 Seminar 12	
9		Delta-function and impulse response Collection Seminar 13	
10		Algorithm of accumulation Seminar 14 Seminar 15	
11		Types of impulse response. Delta function Numerical operations	

		Seminar 16	
12		Zero, linear and nonlinear phase signals Seminar 17 Seminar 18	
13		Identity of input and output signal transforms Classification of Fourier transforms Seminar 19	
14		Digital Filters Seminar 20 Seminar 21	
15		Classification of digital filters Non-recursive filters (FIR) Seminar 22	

Recommended Sources

TEXTBOOK(S)

1. Богданов М.Р. Применения GPS/ГЛОНАСС: учеб. пособие/М.Р. Богданов. - МО., ИД «Интеллект». 2012. – 136 с.

2. Шахворостов С.А. Основы автоматизации: учебн. пособие/ С.А. Шахворостов. – М.: МАДИ, 2004. - 101 с.

3. Артемьева Т.В. Гидравлика, гидромашины и гидропневмопривод: Учебник / Т.В.Артемьева, Т.М.Лысенко, А.Н.Румянцева, С.П.Стесин. – М.: Академия, 2014. – 352 с.

4. Богданов М.Р. Применения GPS/ГЛОНАСС: учеб. пособие/М.Р. Богданов. - МО., ИД «Интеллект». 2012. – 136 с.

5. Шахворостов С.А. Основы автоматизации: учебн. пособие/ С.А. Шахворостов. – М.: МАДИ, 2004. - 101 с.

6. Юревич Е.И. Основы робототехники. - 2-е изд., перераб. и доп. - СПб.: БХВ-Петербург, 2005. - 416 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	**210**
Total Workload/30(h)	**210/30**
ECTS Credit of the Course	**7**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Sensors and Actuators
Course Unit Code	İF-B17
Type of Course Unit	Compulsory
Level of Course Unit	3rd year
National Credits	

Number of ECTS Credits Allocated	7
Theoretical (hour/week)	3
Practice (hour/week)	3
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	6
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:
The subject "Sensors and Actuators" studies the working principles, types, and application areas of sensors and actuators, which are the main components of automated systems and smart devices. The subject examines the structure and functionality of various types of sensors (temperature, pressure, light, gas, proximity, etc.), as well as the control mechanisms and applications of actuators (electromechanical, pneumatic, hydraulic, etc.).

Objectives of the Course:
The main objective of this subject is to introduce students to sensors and actuators used in industrial automation, robotics, intelligent systems and IoT (Internet of Things) applications and to explain their operating principles. The aim is to provide students with practical knowledge and skills on the selection criteria, application areas and integration of these devices in real systems.

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	Will be able to explain the working principles and types of sensors and actuators.	1, 2
2	Will be able to select different sensors and actuators and determine their application areas	1, 2
3	Will be able to process signals received from sensors and apply appropriate methods for controlling actuators	1, 2
4	Will be able to build systems using sensors and actuators in automation and robotics projects	1, 2
5	Will be able to design intelligent systems by applying sensor-actuator interfaces and appropriate protocols	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Basic information about general physical concepts, laws, phenomena, effects. Measurement, units of measurement of physical quantities. Measurement converters, concepts and definitions Measuring instruments. Measurement methods, types, classification Basic concepts and types of errors. Methodological and	

		instrumental errors Total error of converters and its minimization. Rules for ensuring a unified measurement system in the assessment of errors Seminar 1	
2		Classification of converters. General information about signals. Types and characteristics of signals. Signal conversion. Principles of converter construction Seminar 2 Seminar 3	
3		Physical effects, types, revealed as a result of interactions. Effects resulting from mechanical, thermal, spatial and temporal effects Effects resulting from mechanical and thermal effects. Piezoelectric effects. Pressure transducers. Pressure measurement methods Seminar 4	
4		Elements of theory. Spring pressure transducer. Volumetric method. Manometer method. Electric distance manometers Seminar 5 Seminar 6	
5		Thermoresistive effects. Temperature measuring devices and temperature converters. Thermoresistive method Types of thermoresistors, materials used and basic reports. Seebeck effect Seminar 7	
6		Semiconductor thermoresistances. Thermoelectric method. Methodological errors of temperature sensors Seminar 8 Seminar 9	
7		Galvanomagnetic and magnetoresistive effects. Hall effect. Hall sensors Metallic temperature sensors. Thermomanometers Seminar 10	
8		Transformer converters. Simple transformer displacement converter. Differential circuit of a transformer displacement converter. Moving-coil transformer converter Seminar 11 Seminar 12	
9		Angular position converters. Methods of measuring the angular velocity of shaft rotation. Devices for measuring the angular velocity of shaft rotation. Induction transmitters Taxogenerators and distance-measuring electric tachometers.	

		Main faults of tachogenerators Seminar 13	
10		Alternating current tachogenerators. Digital tachometer, its advantages and disadvantages, error analysis Seminar 14 Seminar 15	
11		Effects caused by the action of light rays. Brief information about radiation converters. Photoresistors Photoeffect, laws of photoeffect. Photocells Photodiodes, areas of application Seminar 16	
12		Thermal radiation transducers. General concepts. Complete radiation pyrometers or radiation pyrometers Incomplete radiation pyrometers. Radiation pyrometers with high-temperature parts. Thermal imaging devices and thermographs Seminar 17 Seminar 18	
13		Optical methods of measurement. Interferometers. Light beam sources. Optical detectors. Optical fibers, theory of formation General information about actuators. Electromechanical actuators. Radiation methods of measurement. Basic concepts of radioactive radiation, its converters Seminar 19	
14		Piezoelectric actuators Pneumatic actuators, Compressors Seminar 20	
15		Thermomechanical actuators. Sensor-actuator processor system. Comparative analysis of different actuators Seminar 21	

Recommended Sources

TEXTBOOK(S)

1. Məmmədov R.Q., Abbasov V.A.Informasiyanın alınmasınınfiziki əsasları, Dərslik, 2014. 480 səh
2. Ə.Ş. Abdinov, İ.S. Həsənov, T.X. Hüseynov “Elektron cihazları və emissiya elektronikasının əsasları” Bakı 2011,358 s.
3. Земляков В.В, Панич А.Е. Физические основы получения информации. Учеб. пособ. Ростов на Дону,2010, 132 с
4. Ахмеджанов Р.А. Фиические основы получеия информации: учеб. пособие /Р.А. Ахмеджанов, А.И.Чередов - Омск, изд-во ОмГТУ, 2008, 184 с., ЭБС

5. Николаева Е.В. физические основы получения информации: Измерительные преобразователи. Принципы измерения физических величин: учеб. пособие / Е.В. Николаева, В.В. Макаров; ОмГТУ – Омск: Изд-во ОмГТУ, 2007, 96с. ЭБС.

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 Credit of the Course	**7**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Computer Graphics
Course Unit Code	İF-B18
Type of Course Unit	Compulsory
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	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:
Working with computer graphics is one of the most common areas of using a personal computer. The “Computer Graphics” training course is designed for computer owners who are trying to master the capabilities of modern computer graphics, as well as advertising, designer, public relations specialists who are able to work on a personal computer at an initial level. The purpose of teaching the “Computer Graphics” subject 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.

Objectives of the Course:
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, coding of graphic images, various color models, requirements for choosing a color rendering model, formats of graphic files, 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 mastering 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 Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	4
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	3
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	3
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	3
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	3
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	3

7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Fundamentals of Computer Graphics. Types of Computer Graphics and Their Characteristics Seminar 1	
2		Advantages and disadvantages of raster and vector graphics	
3		General classification of graphic programs used in computer graphics Seminar 2	
4		General classification of graphic programs used in computer graphics	
5		Adobe Photoshop: Purpose and capabilities of the program Seminar 3	
6		Graphic file formats. Overview of image file types. Classification of basic formats. Application areas and main features of various formats	
7		Layers and color channels in Adobe Photoshop Seminar 4	
8		Color models. Additive and subtractive color models. Color manager. Primary, secondary, and derived colors	
9		Creating Collages and Montages in Adobe Photoshop Seminar 5	
10		CorelDraw: Toolbar and effects menu	

11		CorelDraw vector graphics program. Purpose and capabilities of the program Seminar 6	
12		CorelDraw: Creating simple and complex shapes	
13		CorelDraw: transition from raster graphics to vector graphics Seminar 7	
14		CorelDraw: Working with text. Formatting and editing text	
15		CorelDraw: Editing the color fill and outline of an object Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Hacıyeva R.C. İnformatika. Mühazirələr toplusu, QKU-nun Poliqr.və Nəşr.mərkəzi, Bakı, 2020,180 səh.

2. Adobe Photoshop Classroom in a Book (2023 release) By Conrad Chavez. Published Dec 6, 2022 by Adobe Press.

3. Seyidzadə E. V., Əlizadə M.N. Corel DRAW 12. Dərs vəsaiti «MSV NƏŞR». Bakı, 2006, 280 səh.

4. Фолкнер, Чавез: Adobe Photoshop CC. Официальный учебный курс. Эксмо-Пресс, 2021 г. 448 с.

5. Топорков С. Adobe Photoshop CS в примерах, изд-во «БХВ-Петербург», 2005 г., 384 стр.

6. Самоучитель CorelDRAW 2020 / Н. В. Комолова, Е. С. Яковлева. — СПб.: БХВ-Петербург, 2021. — 416 с.

7. А.С. Рукавишникова. «Технический рисунок в CorelDRAW», 2023 г. - 257 стр. 262 иллюстрации

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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Flexible Manufacturing Systems
Course Unit Code	İF-B19
Type of Course Unit	Compulsory
Level of Course Unit	4^{th} year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/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 "Agile Manufacturing Systems" belongs to the block of general technical subjects. "Agile Manufacturing Systems" is one of the important subjects of the Mechatronics and Robotics Engineering specialty. The description of the subject is to form relevant knowledge, skills and habits in students, to ensure their work preparation in the field of mechatronics and robotics.

Objectives of the Course:

The main objective of the subject “Agile Production Systems” is to master the basic principles of agile production theory, the features of building basic models of continuous production systems.
The aim is to form relevant knowledge, skills and habits in students, to ensure the scientific and methodological preparation of future specialists, and to instill in them the ability to model agile production systems.

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	The aim is to create a foundation for general engineering training in students, to instill the ability to use the theoretical knowledge they have acquired from the "Agile Manufacturing Systems" course in any production sector, organization, department, enterprise, or association that corresponds to their professional and qualification level, and to apply it in future educational stages in compliance with existing regulations.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course’s Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5

3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 understanding of agile manufacturing systems Seminar 1	
2		Types and areas of use of agile manufacturing systems; General understanding of their structure and components Seminar 2	
3		Components of Agile Manufacturing Systems; Dams, Kinematic Pairs and Chains Seminar 3	
4		Structural synthesis of agile manufacturing systems; Their maneuverability, degrees of freedom Seminar 4	
5		Claws. Types, design, planning of claws Seminar 5	

6		General stresses. Total, normal and tangential stresses. The main stresses, the main axes. Deformations arising Seminar 6	
7		The occurrence of plane deformation. Plane stress state. Seminar 7	
8		Displacements and deformations Seminar 8	
9		Agile Automated Manufacturing Seminar 9	
10		Agile Automated Systems Seminar 10	
11		Robotic complexes Seminar 11	
12		Automated lines Seminar 12	
13		Assembly operations Seminar 13	
14		Industrial Robots for Automated Line and Assembly Operations Seminar 14	
15		Rooted complexes Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Q.Ə. Rüstəmov. Riyazi modelləşdirmə və Simulyasiya. Dərs vəsaiti. Bakı-AzTU, 2015. – 120 s

2. İbrahimov B. Q. Siqnalların rəqəmli emalı. Tempus. Bakı, AzTU, 2003, 135 s.

3. Неймарк Ю.И. Математическое моделирование как наука и искусство: Учебник. − 2-е изд., испр. и доп. − Н. Новгород: Изд-во Нижегородского госуниверситета, 2010. − 420 с.

4. Rüstəmov Q.Ə. Avtomatik tənzimləmə nəzəriyyəsi: Matlab-Simulinkdə modelləşdirmə. Dərslik. Bakı, AzTU, 2012, 750 s.

5. Thakaa Abd Saleh “Mathematical Modeling and Simulation” of the Composting Process & Municipal Solid Waste Evaluation at Baghdad City, Publisher: LAP LAMBERT Academic Publishing 2017, 160 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 Credit of the Course	**6**

Mechatronics and Robotics Engineering bachelor program, Department of "Ecology and Environment"

Course Unit Title	Civil Defense
Course Unit Code	İF-B21

Type of Course Unit	Compulsory
Level of Course Unit	1st year
National Credits	
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Narmina Rufat Abdullayeva
Name of Lecturer (s)	Narmina Rufat Abdullayeva
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azərbaycan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject "Agile Manufacturing Systems" belongs to the block of general technical subjects. "Agile Manufacturing Systems" is one of the important subjects of the Mechatronics and Robotics Engineering specialty. The description of the subject is to form relevant knowledge, skills and habits in students, to ensure their work preparation in the field of mechatronics and robotics.

Objectives of the Course:
Civil Defense is the science of protecting human safety and health in the environment. It should identify and determine dangerous and harmful factors, study methods and means of human protection, ways to reduce harmful and dangerous factors to a minimum, and develop measures to eliminate the consequences of accidents and disasters occurring in peace and wartime. Emergency events that cause large material losses and human casualties (accidents at nuclear power plants, railways, enterprises using highly active substances, and frequent natural disasters, etc.) show that the CD measures for emergencies of peacetime origin should be reviewed and evaluated. This issue is of greater importance in market relations and the transition period. Civil defense of the Republic of Azerbaijan is a system of measures implemented by state authorities, legal entities and individuals in order to ensure the safety of the population and its territory in peacetime and wartime.

Learning Outcomes

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

1	Formation of ideas about the methodology, goals and objectives of teaching the Civil-Defense subject, scientific-research methods, and its relationship with other sciences	1, 2
2	Formation of ideas about the means of teaching the Civil-Defense subject	1, 2
3	Formation of ideas about the forms of organizing the Civil-Defense subject	1, 2
4	Formation of ideas about the goals and objectives of teaching the Civil-Defense subject	1, 2
5	Formation of ideas about the principles of the Civil-Defense subject, and its training methods	1, 2
6	Formation of the skills to make logical judgments, draw conclusions, and substantiate them.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	2
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	2
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 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		LEVTURE 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		LECTURE 8. Carrying out rescue and other urgent (Emergency and Disaster Management) work	

Recommended Sources

TEXTBOOK(S)

1. R. Quliyev, O. Salayev, C. Dadaşov, T.Həmzəbəyova "Mülki Müdafiə" Baki – 2022
2. Təbiət yanğınlarına qarşı mübarizə üsulları və taktikaları. EuroFire © İyil 2008
3. "Mülki Müdafiə" fənni üzrə sxemlər albomu Baki-2019
4. Əsas Təhlükəsizlik qaydaları. FHN Bakı-2016
5. Tural Əmirxanlə. İlkin yanğınsöndürmə vasitələri. Bakı 2004
6. Malik Abbasov, Şamil Quliyev. İlk yardim. Bakı 2017
7. Təxirə salınmaz ilk tibbi yardım. FHN Bakı-2015

8. Ocaqov H.O.Fövqəladə hallarda həyat fəaliyyətinin təhlükəsizliyi. Bakı 2010
9. N.M. Hacıyev S.H. Mahmudov. Aqrar sahədə mülkġ müdafġə. Gəncə - 2012
10. Ocaqov H.O. Fövqəladə halların nəticələrinin aradan qaldırılması. Bakı, 2009.
11. Ocaqov H.O. Fövqəladə hallarda həyat fəaliyyətinin təhlükəsizliyi (Ali məktəblər üçün dərslik). Çaşıoğlu, Bakı, 2002
12. Ocaqov H.O. Mülki müdafiə mühafizə qurğuları. 1993
13. Ocaqov H.O. Fövqəladə hallarda həyat fəaliyyətinin təhlükəsizliyi (Mülki müdafiə). Bakı, 2002
14. Ocaqov H.O. Mülki müdafiənin mühafizə qurğuları. Bakı, 2003
15. Ocaqov H.O. Fövqəladə halların idarə olunması. Bakı, 2008
16. Ocaqov H.O., Danyalov Ş.D. Həyat fəaliyyətinin təhlükəsizliyinin nəzəri əsasları. Bakı, 2008
17. “Mülki müdafiə”. Kərimov Zabit Səməd Bakı 2013
18. Kərimov Z.S. Həyat fəaliyyətinin təhlükəsizliyi, əməyin mühafizəsi. Bakı, 2016
19. R. Quliyev, O. Salayev, C. Dadaşov, T. Həmzəbəyova Mülki müdafiə Bakı, 2022
20. Azərbaycan Respublikası Fövqəladə Hallar Nazirliyi Akademiyasının rəisi general-mayor Baba Salayev, polkovnik İlham Babaşov, polkovnik-leytenant Rəfail Mustafayev “Xilasedicinin kitabı” Bakı, 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	**90**
Total Workload/30(h)	**90/30**
ECTS Credit of the Course	**3**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Electrotechnics
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 (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Durdana Rustamova
Name of Lecturer (s)	Durdana Rustamova
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The course **Electrical Engineering** provides students with fundamental knowledge of the basic laws of electrical engineering, methods for analyzing electrical circuits, principles of electric and magnetic circuits, operating principles of electrical devices, their properties, parameters, and performance characteristics. The course emphasizes the importance of electrical engineering knowledge in modern engineering applications.

Objectives of the Course:
The primary objective of this course is to provide future specialists with fundamental knowledge of Electrical Engineering and to develop the ability to apply this knowledge effectively in professional practice. The acquired competencies will enable students to monitor, maintain, and improve the operation of electrical and electronic systems and devices.

Learning Outcomes

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

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	Ability to apply knowledge of mechanics, electronics and informatics necessary for the development and operation of complex technical systems	5
2	Ability to apply knowledge related to measuring instruments, electrical devices and engineering calculations in mechatronic systems	4
3	Ability to use modern scientific and technological achievements in the design and operation of electrical and mechatronic systems	3
4	Ability to diagnose, analyze and eliminate faults in electrical and mechatronic systems	3
5	Ability to ensure safe operation of electrical equipment and comply with occupational safety and environmental protection requirements	3
6	Ability to work effectively both independently and as a member of a team	4
7	Ability to generate new approaches and engineering solutions for improving electrical systems, energy efficiency and automation processes	3
8	Ability to analyze and develop electrical circuit diagrams and electrical system configurations, as well as organize their maintenance, modernization and restoration	3
9	Ability to participate in continuous learning and professional development activities in order to keep pace with advances in electrical and mechatronic technologies	3

10	Ability to use foreign language skills to access scientific and technical literature, standards, manuals and documentation related to electrical engineering and mechatronic systems	3
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1		Historical development of electrical engineering. Fundamental concepts of electrical engineering. Seminar 1	
2		Fundamental quantities characterizing electromagnetic processes in electric circuits. Seminar 2	
3		Electrical power sources. Electrical measuring instruments. Seminar 3	
4		Fundamental laws of electric circuits. Ohm's law for a circuit section and complete circuit. Power balance. Kirchhoff's laws. Seminar 4	
5		Operating modes of electric circuits. Methods of resistor connections. Seminar 5	
6		Ideal electric circuits containing R, L, and C elements. Seminar 6	
7		Voltage resonance. Power triangle. Seminar 7	
8		Single-phase alternating current (AC) circuits. Seminar 8	
9		Three-Phase Alternating Current (AC) Circuits. Seminar 9	
10		Transformers. Construction and Operating Principles of Transformers. Seminar 10	
11		Types of Transformers. Three-Phase Transformers. Autotransformers. Seminar 11	
12		Current Transformers. Voltage Transformers. Seminar 12	

13		Direct Current (DC) Machines. Seminar 13	
14		Asynchronous (Induction) Machines. Seminar 14	
15		Synchronous Machines. Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Abdullayev N.D., İsmayılov K.Q., Əbdülqədirov A.İ. "Elektrik maşınlarının sınağı və etibarlılığı" Bakı-1990

2. Abdullayev Y.R. "Elektrik və elektron aparatları" Bakı, Hərbi nəşriyyat, 1999 (I hissə)

3. Abdullayev Y.R. "Elektrik və elektron aparatları" Bakı, Hərbi nəşriyyat, 1999 (II hissə)

4. Osmanov S.C., Qasımova T.Q. "Elektrik maşınları" (I hissə) Bakı-2007

5. Osmanov S.C., "Elektrik maşınları" (II hissə) Bakı-2010

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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

ECTS allocated based on Student Workload	
Total Workload	**150**
Total Workload/30(h)	**150/30**
ECTS Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Electrical machines
Course Unit Code	ATMF-B03
Type of Course Unit	Elective
Level of Course Unit	2^{nd} year
National Credits	
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	3
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 course "Electrical Machines" provides students with fundamental knowledge of the construction, operating principles, characteristics, performance parameters, and applications of electrical machines. The course covers transformers, direct current (DC) machines, induction machines, and synchronous machines, as well as their role in industrial and mechatronic systems. Special attention is given to the analysis, operation, maintenance, and efficient use of electrical machines in engineering practice.

Objectives of the Course:
The primary objective of this course is to provide students with theoretical and practical knowledge of electrical machines and to develop their ability to analyze, operate, maintain, and troubleshoot electrical equipment. The acquired knowledge will enable future engineers to effectively apply electrical machines in industrial automation, mechatronic systems, and power engineering applications.

Learning Outcomes

	At the end of the course the student will be able to know	Assessment
1	Construction and operating principles of transformers	1, 2
2	Types and applications of transformers	1, 2
3	Construction and operating principles of DC machines	1, 2
4	Characteristics and performance of DC machines	1, 2
5	Construction and operating principles of induction machines	1, 2
6	Characteristics and applications of induction machines	1, 2
7	Construction and operating principles of synchronous machines	1, 2
8	Characteristics and applications of synchronous machines	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	Ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	Ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5

3	Ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	Ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	Ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	Ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	Ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	Ability to effectively interact both individually and as part of a team to achieve goals	3
9	Ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	Ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Introduction to Electrical Machines. Classification of Electrical Machines Seminar 1	
2		Electromagnetic Principles of Electrical Machines Seminar 2	
3		Transformers: Construction and Operating Principles Seminar 3	
4		Equivalent Circuit and Performance Characteristics of Transformers Seminar 4	

5		Three-Phase Transformers and Autotransformers Seminar 5	
6		Parallel Operation and Applications of Transformers Seminar 6	
7		Introduction to Direct Current (DC) Machines Seminar 7	
8		DC Generators: Construction, Principles and Characteristics Seminar 8	
9		DC Motors: Construction, Principles and Characteristics Seminar 9	
10		Introduction to Induction Machines Seminar 10	
11		Three-Phase Induction Motors and Their Characteristics Seminar 11	
12		Starting, Speed Control and Applications of Induction Motors Seminar 12	
13		Introduction to Synchronous Machines Seminar 13	
14		Synchronous Generators and Synchronous Motors Seminar 14	
15		Applications, Maintenance and Troubleshooting of Electrical Machines Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. P. C. Sen, Principles of Electric Machines and Power Electronics, Wiley.
2. A. E. Fitzgerald, Charles Kingsley Jr., Stephen D. Umans, Electric Machinery, McGraw-Hill.
3. I. J. Nagrath, D. P. Kothari, Electric Machines, McGraw-Hill Education.
4. B. L. Theraja, A. K. Theraja, A Textbook of Electrical Technology, Volume II.
5. Stephen J. Chapman, Electric Machinery Fundamentals, McGraw-Hill.

Assessment

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

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

Course Policies

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

ECTS allocated based on Student Workload

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

Mechatronics and Robotics Engineeringbachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Microprocessors and Microcontrollers
Course Unit Code	ATMF-B04
Type of Course Unit	Elective
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	4
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 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. Electronic devices play a great role in increasing the reliability of electrical systems. The subject of “Microprocessors and Microcontrollers” also plays an indispensable role in robotics, the military industry, as well as in all information fields. Considering all this, it is clear that studying “Microprocessors and Microcontrollers” is important.

Objectives of the Course:
The course "Microprocessors and Microcontrollers" is the basis in the modern training system of students. It is taught to 2nd year students and its main task is to create a fundamental knowledge base. The goal and main objective of teaching the subject is to form knowledge about microprocessors in students, to study the principles of creating microprocessors, microcontroller systems and their software. In this regard, the main requirements set for the course "Microprocessors and Microcontrollers" are formed. Thus, in industry, without disrupting technological processes, they must be able to apply methods and means of ensuring quality control in the areas of production and operation, control and diagnostic systems and complexes and their software without disrupting technological processes.

Learning Outcomes

At the end of the course the student will be able to know		Assessment
1	Classification of microprocessors	1, 2
2	The role of the microprocessor in the development of technical systems	1, 2
3	The structure of a microprocessor controller	1, 2
4	Microprocessor control devices	1, 2
5	Technical means of systems with microcontrollers	1, 2
6	Organization of the information processing process in microprocessor systems	1, 2
7	Interfaces of systems with microcontrollers	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them,	4

	implementing labor protection and environmental standards	
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 microprocessors Seminar 1	
2		Classification of Microprocessors Seminar 2	
3		The role of the microprocessor in the development of technical systems Seminar 3	
4		Structure of microprocessor control systems Seminar 4	
5		The structure of the microprocessor controller Seminar 5	
6		Microprocessor control devices. Technical means of microprocessor systems Seminar 6	
7		Trunk-modular architecture of MP systems Seminar 7	
8		Principles of memory organization and information transfer in microprocessor systems Seminar 8	
9		Microcontroller devices: their purpose, structure, types and parameters. Popular microcontroller families Seminar 9	
10		Devices based on PIC microcontrollers and their schematics. Devices based on AVR microcontrollers and their schematics Seminar 10	
11		A device that listens to internal organ sounds through a microcontroller-powered stethoscope Seminar 11	

12		History of the development of computed tomography Seminar 12	
13		Innovative optical technology Workshop 13	
14		Working principle of digital X-ray system Seminar 14	
15		Types and methods of defibrillation Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Быстрое Ю.А., Мироненко И.Г. Электронные цепи и микросхемотехника. М.: Высшая школа, 2002.

2. Mohammad Shafivulla, Dr. M. A. Naqvi, G. Vijay Kumar Microprocessors and Microcontrollers. LAP LAMBERT Academic Publishing 2018

3. Padma Charan Sahu, Sunita Panda, Microprocessors and Microcontrollers. LAP LAMBERT Academic Publishing, year 2018

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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Embedded Microprocessors
Course Unit Code	ATMF-B04
Type of Course Unit	Elective
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	4
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 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. The subject of “Embedded Microprocessors” also plays an indispensable role in robotics, the military industry, as well as in all information fields. Considering all this, it is clear that studying “Embedded Microprocessors” is important.

Objectives of the Course:
The course “Embedded Microprocessors” is the basis for the modern training system of students. The goal and main objective of teaching the subject is to form knowledge about microprocessors in students, to study the principles of creating microprocessors, microcontroller systems and their software. In this regard, the main requirements set for the course “Embedded Microprocessors” are formed. Thus, in industry, they must be able to apply methods and means of ensuring quality control in the areas of control and diagnostics systems and complexes and their software, operation and maintenance, production and operation without disrupting technological processes.

Learning Outcomes

At the end of the course the student will be able to know		Assessment
1	Classification of microprocessors	1, 2
2	The role of the microprocessor in the development of technical systems	1, 2
3	The structure of a microprocessor controller	1, 2
4	Microprocessor control devices	1, 2
5	Technical means of systems with microcontrollers	1, 2
6	Organization of the information processing process in microprocessor systems	1, 2
7	Interfaces of microcontroller systems	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course’s Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4

4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 microprocessors Seminar 1	
2		Classification of Microprocessors Seminar 2	
3		The role of the microprocessor in the development of technical systems Seminar 3	
4		Structure of microprocessor control systems Seminar 4	
5		The structure of the microprocessor controller Seminar 5	
6		Microprocessor control devices. Technical means of microprocessor systems Seminar 6	

7		Mainframe-modular architecture of microprocessor systems Seminar 7	
8		Principles of memory organization and information transfer in microprocessor systems Seminar 8	
9		Microcontroller devices: their purpose, structure, types and parameters. Popular microcontroller families Seminar 9	
10		Devices based on PIC microcontrollers and their schematics. Devices based on AVR microcontrollers and their schematics Seminar 10	
11		A device that listens to internal organ sounds through a microcontroller-powered stethoscope Seminar 11	
12		History of the development of computed tomography Seminar 12	
13		Innovative optical technology Seminar 13	
14		Working principle of digital X-ray system Seminar 14	
15		Types and methods of defibrillation Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Быстрое Ю.А., Мироненко И.Г. Электронные цепи и микросхемотехника. М.: Высшая школа, 2002.

2. Mohammad Shafivulla, Dr. M. A. Naqvi, G. Vijay Kumar Microprocessors and Microcontrollers. LAP LAMBERT Academic Publishing 2018

3. Padma Charan Sahu, Sunita Panda, Microprocessors and Microcontrollers. LAP LAMBERT Academic Publishing, year 2018

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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Basics of Circuitry
Course Unit Code	ATMF-B04
Type of Course Unit	Elective
Level of Course Unit	2^{nd} year
National Credits	

Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Sama Bayramova Gadir
Name of Lecturer (s)	Sama Bayramova Gadir
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
Tələbələrdə müvafiq bilik, bacarıq və vərdişlərlərin formalaşdırılması, onların kompüterdə iş hazırlığının təmin edilməsi.

Objectives of the Course:
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 optimal performance of the functions provided by them, and the resolution of issues of 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	Formation of ideas about the goals and objectives of the subject of Fundamentals of Circuit Engineering as a science, scientific research methods, and its relationship with other sciences	1, 2
2	Formation of ideas about the goals and objectives of the training "Fundamentals of Circuit Engineering" for undergraduate students	1, 2
3	Performance of practical tasks used in the training of the course "Fundamentals of Circuit Engineering" for undergraduate students	1, 2
4	Controlling and investigating the level of performance of practical tasks	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Introduction to the basics of circuit engineering. Basic concepts. Characteristics, types and marking of digital devices Seminar 1	

2		Logical constants and variables. Operations of Boolean algebra. The duality principle in logical operations Seminar 2	
3		Methods of describing logic variables with electrical signals. Classification of basic ME Seminar 3	
4		Widely used basic logic circuits Seminar 4	
5		Combinational digital devices. Typical functional diagrams of combinational digital devices Seminar 5	
6		Multiplexer and demultiplexer Seminar 6	
7		Registers.Counters Seminar 7	
8		Edcoder and decoder Seminar 8	
9		Triggers Seminar 9	
10		Additives Seminar 10	
11		Comparators Seminar 11	
12		Microprocessors, their purpose, classification and their interaction with the devices of technical systems Seminar 12	
13		Interaction of the microprocessor with RES devices Seminar 13	
14		Architecture of Microprocessor Systems Seminar 14	
15		Microprocessor Operating Algorithm Seminar 15	

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 2021by Pearson Education, Inc.
3. Thomas L. Floyd Digital Fundamentals,11th edition, ISBN 978-0-13-273796-8, published by 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 Dijital Elektronik İSBN 978-605-324-001-3, 2016, 220 səh.
6. Volnei A. Pedroni DIGITAL ELECTRONICS AND DESIGN WITH VHDL, 2008 by Elsevier Inc. All rights reserved.
7. Ə.H. Məmmədov, Mikrosxemotexnika dərs vəsaiti.Bakı Çaşıoğlu 2002
8. F.H. Məmmədov, Ə.H.Məmmədov, M.Ə.Məmmədov Sxematexnikanın əsasları Dərslik I-II hissə Bakı 2007.
9. Гусев В.Г., Гусев Ю.И. Электроника: Учебное пособие для вузов. 2-ое изд., перераб. и дополн. - М.: Высшая школа, 1991г. - 622с.

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 Credit of the Course	**5**

Mechatronics and Robotics Engineeringbachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Engineering Mathematics
Course Unit Code	ATMF-B05
Type of Course Unit	Elective
Level of Course Unit	2nd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	4
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:
The subject of "Engineering Mathematics" is a discipline that deals with the application of mathematical methods to solve real-world problems, including technology, economics, physics, biology, and other fields. It is key to the development of technological and economic progress, as it allows solving complex problems in various fields, such as optimizing production, reducing costs, improving product quality, etc.

Objectives of the Course:
The development of "engineering mathematics" is associated with the use of new mathematical methods and tools, such as mathematical modeling, differential equations, probability theory, and others. At the same time, extensive knowledge in various fields of application is required, as well as the ability to work with complex data and programming.
"Engineering mathematics" is of great importance for the development of science and technology in our lives, helping to create new innovative products, improve living conditions, and solve complex problems that modernity poses to us.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	To know mathematical methods and their application possibilities, for this it is enough to be informed in all areas of mathematics	1, 2
2	to have the logic and methodology of applied mathematics, modeling methodology	1, 2
3	to have the art of setting and formalizing actual problems.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5

3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Definition of vector, classification of vectors. Linear operations on vectors Seminar 1	
2		Projection of a vector onto an axis. Vector coordinates	
3		Scalar product of vectors Seminar 2	
4		Cross product of vectors. The product of three vectors	
5		The concept of matrix. Types of matrices Seminar 3	
6		Linear operations on matrices. Nonlinear operations on matrices	
7		Determining the determinant of a matrix. Determining the rank of a matrix Seminar 4	

8		Coordinate system transformation (rotation). Systems of linear equations	
9		Eigenvalues of a matrix. Eigenvectors of a matrix Seminar 5	
10		Differential calculus. The concept of derivative	
11		The Physical and Geometric Meaning of Derivatives Seminar 6	
12		Rules of differentiation	
13		Integral calculus. Indefinite integral Seminar 7	
14		Definite integral	
15		Applications of Differential and Integral Calculus Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Н.В. Бурмашева, Е.Ю. Просвиряков, С.А. Берестова, Инженерная математика, Учебная пособие, Екатеринбург, 2022

2. Н.И. Коршунова ПРИКЛАДНАЯ МАТЕМАТИКА ДЛЯ ЭКОНОМИСТОВ Учебное пособие для бакалавриата, МОСКВА, 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 Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Mathematical Logical Problems
Course Unit Code	ATMF-B05
Type of Course Unit	Elective
Level of Course Unit	2^{nd} year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Faracova Sona Samir

Name of Lecturer (s)	Faracova 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 covers the areas of analyzing information given in numerical, graphical and tabular form and discovering patterns, calculating various indicators based on the given information, summarizing information given in numerical, graphical and tabular form, analyzing the mathematical formulation of the problem, assessing the sufficiency of data in arithmetic, algebra and geometry problems, determining whether the information in the conditions is sufficient to solve the problem, anagrams, and verbal tests.

Objectives of the Course:
The aim of the course is to ensure the formation of mathematical and logical thinking in students. This includes the analysis of information presented in numerical, graphical and tabular form and the detection of regularities, the assessment of the sufficiency of data in arithmetic, algebra and geometry problems, and 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 style	1, 2
2	Analysis of conditions and selection of conditions necessary for solving a problem	1, 2
3	Analysis of information given in numerical, graphical and tabular form and detection of regularities	1, 2
4	Calculation of various indicators based on the given information	1, 2
5	Generalization of information given in numerical, graphical and tabular form. Analysis of the mathematical formulation of the problem	1, 2
6	Understanding the content of mathematical problems and questions	1, 2
7	Evaluation of the sufficiency of data in arithmetic, algebra and geometry problems	1, 2
8	Determination of whether the information in the conditions is sufficient for solving the problem	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	3
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	3
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	3
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Passwords. Sequences of numbers. Obvious and implicit operators Seminar 1	
2		Choosing a word(s) based on analogy	
3		Finding an incomplete pair according to a given logical relationship. Logical analysis of the text Seminar 2	
4		Building various combinations of figures	
5		Selecting a picture by analogy. Rules for distinguishing analogous pictures Seminar 3	

6		Classification and solutions of picture tests	
7		Imaginary joining or separating of parts of a figure. Unfolding a folded sheet with cuts Seminar 4	
8		Rotating, unfolding, and folding the figure	
9		Picture - number relationships. Methods for solving tests given in tabular form Seminar 5	
10		Methods for solving tests given in graphical form	
11		Scales. Solving tests related to mathematical regularity Seminar 6	
12		Solving logical-mathematical problems	
13		Tests involving mathematical operations. Geometric logic Seminar 7	
14		Sapyor. Verbal test solutions	
15		Solving modular test groups Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. İsmayılov F.S., Həsənov İ.R. “Məntiqi təfəkkürün inkişaf etdirilməsi üçün İQ test nümunələri” I hissə. Bakı-2010
2. İsmayılov F.S., Həsənov İ.R. “Məntiqi təfəkkürün inkişaf etdirilməsi üçün İQ test nümunələri” II hissə. Bakı-2010
3. Puza Yayınları, IQ Soru Bankası 2018
4. Metropol Yayınları, IQ Soru Bankası 1, 2 ve 3, 2019.
5. Əsədov R. “Məntiqi təfəkkürü yoxlayan testlər”. Bakı-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 Credit of the Course		**4**

Mechatronics and Robotics Engineeringbachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Systems Analysis
Course Unit Code	ATMF-B05
Type of Course Unit	Elective
Level of Course Unit	2^{nd} year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1

Laboratory (hour/week)	
Year of Study	2
Semester when the course unit is delivered	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).

Objectives of the Course:
The purpose of the subject "Systems Analysis" is to study the role, characteristics, principles, stages, and methods of system modeling of systemic analysis and a systematic 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 discipline	1, 2
2	Formation of ideas about system analysis	1, 2
3	Formation of ideas about the systematic approach, its essence and principles	1, 2
4	Formation of ideas about the features of the systematic approach in solving management problems	1, 2
5	Formation of ideas about modeling;	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL

1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		The purpose, subject and basic concepts of the subject	
2		System Analysis Seminar 1	
3		Systematic approach, its essence and principles Seminar 2	
4		A systematic approach to studying and improving complex systems Seminar 3	
5		Stages of systematic analysis in solving management problems	

6		Modeling Seminar 4	
7		Types of modeling	
8		Information Modeling Seminar 5	
9		Classification of information models	
10		The main stage of systematic analysis — building a model of the studied object Seminar 6	
11		Computer modeling, stages, instrumental tools	
12		Mathematical Modeling Seminar 7	
13		Modeling problems	
14		Modeling a system under uncertainty Seminar 8	
15		Requirements analysis and preliminary system design. Seminar 9	

Recommended Sources

TEXTBOOK(S)

1. Kərimov S.Q. İnformasiya sistemləri. - Bakı: Elm, 2008, 676 s.
2. Sərdarov Y.B. İnformatika və hesablam texnikasının riyazi elementləri /Dərs vəsaiti/. – Bakı, 2006. – 102 s.
3. Бахвалов Л. Виды моделирования. Компьютерное моделирование. http://bourabai.kz/cm/bahvalov2.htm
4. Губанов В.А., Захаров В.В., Коваленко А.Н. Введение в системный анализ. Л.: Изд-во Ленинградского ун-та, 1988. 232 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 Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Automated design systems for devices
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 (hour/week)	2

Practice (hour/week)	1
Laboratory (hour/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 purpose of teaching the subject "Fundamentals of Automated Design Systems of Devices" is to instill theoretical knowledge about automated design systems in students and to develop practical knowledge and skills that allow them to solve complex tasks in the field of automated design systems. As a result of teaching the subject, students will gain knowledge about system analysis of design, technical and mathematical support of automated design systems, geometric models and machine graphics, mathematical support of project decision synthesis, support of automated design systems, automated systems for production purposes, and CALS technologies.

Objectives of the Course:

People set a certain goal in their activities and seek means to achieve that goal. The goal is usually a product of the human mind. The means of achieving the goal are, as a rule, objects with certain functional and production properties (structures, systems, processes, programs, etc.). The creation of an object begins with its design. The reason for the high quality of projects obtained through automated design systems is that the high capabilities of the computers included in the ALS allow for a more in-depth study of the problem based on mathematical modeling and optimization of basic decisions. The main task of the subject "Fundamentals of Automated Design Systems of Devices" is to form theoretical and practical knowledge about modern automated design systems and their basic principles in students.

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	modern automated design systems and their general terminology;	1, 2
2	structure and subsystems of automated design systems	1, 2
3	types of support for automated design systems	1, 2
4	interaction of ALS subsystems in the automated design process	1, 2

5	automation of the design sequence	1, 2
6	development of the ALS structure	1, 2
7	use of the developed ALS for product design	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Introduction. General concept. Formation of design science. Summary of research in the field of design methodology	
2		Design and artificial intelligence. System analysis of design. Principles of a systematic approach. Purpose of design. Design objects. Design process Seminar 1	
3		Basic principles of ALS. Classification of ALS. Structure of ALS. Design levels of ALS. Design stages of ALS. Design procedures in ALS	
4		Models and their parameters in ALS. Generalized algorithm of automated design. Product life cycle. Introduction to CALS technologies. Seminar 2	
5		General characteristics of technical support. Requirements for technical support of ALS. Computer architecture and structure. Software data processing tools. Data preparation and input tools. Data display and documentation tools	
6		Technical means of project decision archives. Data dissemination tools. Interface. Types of computers and computing systems Seminar 3	
7		General characteristics of mathematical support. Morphological description of the design object. Functional description of the design object. Decision-making methods. Requirements for mathematical models and methods used in ALS Principles of simulation models	
8		Types of geometric models. Methods and algorithms of computer graphics. Construction of geometric models. Surface models. Optimization criteria. Optimization problems taking into account constraints. Classification of mathematical programming methods Seminar 4	
9		Methodological support of the ALS. Linguistic support of the ALS. Management linguistic support. Basic linguistic support	
10		Language processors. Software for ALS. General software. Information support for ALS. Database. Data security and integrity. Organizational support Seminar 5	
11		Types of CASE (Computer Aided Software Engineering) systems	
12		ERP systems. Logistics systems. Automated control systems of technological processes. ALS for mechanical engineering. Basic functions of CAD systems. Basic functions of CAE systems Seminar 6	

13		Main functions of CAM systems. Prototyping. Graphics core. Structure of CAD/CAM systems	
14		High-level ALS for mechanical engineering. Examples of CAD/CAM/CAE/PDM systems for mechanical engineering and instrument making Automated product life cycle management systems. Stages of development of CALS technologies Seminar 7	
15		Strategy and issues of the CALS concept. Basic principles of CALS technology. CALS systems, technologies and standards Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Mövlazadə V.Z., Hüseynov H.Ə. Maşınqayırmada texnoloji proseslərin avtomatlaş-dırılmış layihələndirmə sistemləri. Bakı: AzTU, 1990, 113 s
2. Əhmədov M.A., Hüseynov A.H., Məmmədyarov C. F. Avtomatlaşdırılmış layihələndirmə sistemlərinin əsasları, “Sumqayıt” nəşriyyatı, Dərslik, Bakı, 2003, 242 s.
3. Hüseynov H.Ə. Avtomatlaşdırılmış layihələndirmə sistemlərinin əsasları. Bakı: AzTU,1995, 111s.
4. Hüseynov H.Ə., Şükürov A.R. «Metalkəsən dəzgahların avtomatlaşdırılmış layihələndirilməsi», AzTU, 2001, 120s.
5. Hüseynov H.Ə., Mirzəyev A.M., Əliyev R.R. və b. İnformasiya axtarış sistemlərinin texnoloji təminatı. Bakı: AzTU, 1990, 84s.
6. Гусейнов Г.А. «Программные управление точностью механической отработки», Баку, Чашыоглу, 2000, 282с.
7. Гусейнов Г.А., Багиров С.А. «Программные управление точностью внутренного шлифования», Баку, Чашыоглу, 2001, 137с.

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 Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Materials and Processes
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 (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3

Semester when the course unit is delivered	5
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 subject "Materials and Processes" teaches materials about the use of conductors, semiconductors, dielectrics, and magnets in device manufacturing, the control of production processes through devices made using them, and methods and means of production control.

Objectives of the Course:
The main goal of teaching the subject is to teach students the properties of device materials, their use for monitoring and controlling production processes, the applied technological regime and the operating principles of equipment. The subject "Materials and Processes" plays a great role in the training of engineering personnel.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Students' mastery of materials about the materials used in the manufacture of devices and the technological processes of device manufacturing	1, 2
2	Formation of general knowledge about the nature, essence, tools and means of device manufacturing in students	1, 2
3	Acquaintance with the relationship between device elements and the structure of the processes occurring at this time	1, 2
4	Study of the selection and application features of device schemes	1, 2
5	Study of the selection and use features of device materials	1, 2
6	Performance of practical tasks used in the field of Materials and processes for undergraduate students	1, 2
7	Controlling and investigating the level of performance of practical tasks	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL

1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	4
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	3
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	3
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	4
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	3
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Electrotechnical materials and products. Classification of materials. Basic properties of metals, dielectrics and semiconductors Seminar 1	
2		Electrical properties. Optical properties. Acoustic properties	
3		Magnetic properties. Thermal properties. Mechanical properties Seminar 2	
4		Conductive materials. Basic properties of metals. Materials with high conductivity	
5		Metals for various purposes. Noble metals. High-resistance alloys for resistors and heating devices Seminar 3	

6		Thermocouple alloys and contact materials. Solders and fluxes. Non-metallic conductive materials	
7		Semiconductor materials. Electrical conductivity of semiconductors. Special and additive semiconductors Seminar 4	
8		Temperature dependence of the specific electrical conductivity of a semiconductor. The effect of mechanical deformation on the electrical conductivity of semiconductors	
9		Elements and chemical compounds with semiconductor properties. Elements with semiconductor properties. Semiconductor chemical compounds Seminat 5	
10		Classification of dielectrics. Gaseous dielectrics. Liquid dielectrics. Petroleum electrical insulating oils. Synthetic liquid dielectrics	
11		Polymer dielectrics. Electrical insulating varnishes and compounds. Elastic thin films. Fibrous materials Seminar 6	
12		Layered plastics. Plastics. Insulating rubbers. Electrical insulating glasses. Ceramic dielectric materials. Mica and materials made from mica	
13		Active dielectrics. Magnetoelectrics: basic properties, classification, application. Piezoelectrics. Piezoeffect phenomenon Seminar 7	
14		Pyroelectrics and their application in technology. Electrets, their physical properties and application in technology. Liquid crystals and their application in technology	
15		Magnetic materials. Classification of substances according to their magnetic properties. Types of magnetic materials. “Soft” magnetic materials. “Hard” magnetic materials Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Orucov A.O., Niftiyev S.N., İbrahimov B.Q. Elektrotexniki materiallar. Ali məktəblər üçün dərslik. Bakı-2009.
2. Mohammad El Saba. Advanced Electronic Engineering Materials & Nanotechnology. Ain Shams University-2020
3. Quliyev Ə.M., Səfiyev E.S., Kərimov Q.M. Elektrotexniki materiallar. – Mütərcim, Bakı I hissə, 2006.
4. Quliyev Ə.M., Səfiyev E.S., Kərimov Q.M. Elektrotexniki materiallar. – Mütərcim, Bakı II hissə, 2007, 145 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 Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Materials Science
Course Unit Code	ATMF-B06

Type of Course Unit	Elective
Level of Course Unit	3^{rd} year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	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 "Materials Science" provides basic information about the composition, structure, chemical, physical and mechanical properties of materials, the determination of the physical and mechanical properties of materials through testing methods, and materials used in industry and their promising types and properties.

Objectives of the Course:
The goal and main objective of teaching the subject "Materials Science" is to form knowledge about materials science in students, to study the principles of creating new types of materials, the structure of materials, their physical and chemical properties, and the properties of alloys with different compositions.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Classification of materials science	1, 2
2	The role of materials science in the development of technical systems	1, 2
3	Methods of measuring hardness	1, 2
4	Non-ferrous metals and their alloys	1, 2

5	Solid alloys and mineral-ceramic materials	1, 2
6	Non-metallic materials	1, 2
7	Bonding materials	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		The purpose and historical development of the subject. Basic information about metals, their classification and properties. Ferrous and non-ferrous metals	
2		The purpose and historical development of the subject. Basic information about metals, their classification and properties. Ferrous and non-ferrous metals Seminar 1	
3		Basic information about alloys. Internal structure of alloys. Crystallization of alloys. Crystallization process of liquid alloys	
4		General information on the production of cast iron and steel. Characteristics of the phase diagram of iron-carbon alloys. Structures of iron-carbon alloys Seminar 2	
5		General information about steel production. Bessemer and Thomas processes in steel production. Steel production by the Marten process	
6		General information about heat treatment. Transformations occurring in steel during heating. Heating devices. Heat treatment units. Seminar 3	
7		The essence of the chemical-thermal treatment process. Thermal treatment of gray cast iron. Production of wrought iron	
8		Non-ferrous metals and their alloys. Copper alloys. Tin, bronze. Special bronzes. Aluminum Seminar 4	
9		Cast Al alloys. Wrought alloys. Magnesium and its alloys. Titanium and its alloys	
10		Non-metallic materials Seminar 5	
11		Basic parameters of electrical materials	
12		Classification of dielectric materials. Gaseous dielectrics. Liquid dielectrics Seminar 6	
13		Electrical insulating varnishes. Compounds. Fibrous electrical insulating materials. Electrical insulating plastic masses	
14		Semiconductor materials. Basic semiconductor materials Seminar 7	
15		Magnetic materials. Soft magnetic materials. Hard magnetic materials. Ferrites Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. F.D. Gelin, E.İ. Krupitski, İ.P. Poznyak. Materialşünaslıq. "Maarif" nəşriyyatı. Bakı, 1983.

2. Y.Q. Vonoqradov, S.S. Orlov, L.A. Popova, "Çilingər-santexniklər, çilingər-quraşdırıcılar, inşaatmaşınlarının maşinistləri üçün Materialşünaslıq. Maarif, 1983.

3. V.A. Dubrovksi "Materialşünaslığın əsasları". Azərtədrisnəşr, Bakı 1963.

4. "Справочник по електротехническим материалом". В. 3т.т. 2/нод ред. Ю.В.Коричкого и др. М. Энергоатомиздат 1987.

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 Credit of the Course	**4**

Mechatronics and Robotics Engineeringbachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Smart systems
Course Unit Code	ATMF-B07
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	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.

Objectives of the Course: 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		Assessment
1	Natural intellectual system - Man and his main mission	1, 2
2	Philosophical-associative essence of man	1, 2
3	Artificial intelligence - the basis of new information technology	1, 2
4	Intellectual information-search systems	1, 2
5	Intellectual application software packages	1, 2
6	Computational-logic systems	1, 2
7	Intrinsically intellectualized system based on a functional approach	1, 2
8	Structure and design of intellectual systems	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course’s Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5

8	ability to effectively interact both individually and as part of a team to achieve goals	5
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	5
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 concepts. Artificial intelligence	
2		Intellectual information retrieval systems. Structure and design of intellectual systems Seminar 1	
3		Structure and design of intellectual systems. Knowledge base design	
4		The structure of the knowledge base and its interaction with other components of intelligent systems. Metaknowledge level Seminar 2	
5		Knowledge representation and modeling	
6		Checklist for designing intelligent systems Seminar 3	
7		Checklist for designing intelligent systems	
8		The number of stages in designing intelligent systems. Seminar 4	
9		The next stages that determine the existence of intelligent systems	
10		Analysis of the subject area and methods of acquiring knowledge. Seminar 5	
11		Formation of knowledge in the knowledge base of intellectual systems during the study of economic and production systems	
12		Discovery of the source of knowledge. Intellectual agents. Tools used by the expert Seminar 6	
13		Methods of extracting knowledge from a subject matter expert. Technology for building expert systems	
14		Knowledge Base Intellectual Editor Seminar 7	

15		Stages in the process of creating expert systems. Nanotechnology: Human Searches and Perspectives in Technology Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Андрейчиков, А.В. Интеллектуальные информационные системы: учебник для студ. вузов, обуч. по спец. "Прикладная информатика в экономике" / Андрейчиков А. В., Андрейчикова О. Н. - М.: Финансы и статистика, 2004. - 424 с.
2. Воронов, А.Е. Технология использования экспертных систем / А.Е. Воронов. - М.: Лаборатория книги, 2011. - 109 с.
3. Интеллектуальные системы: учебное пособие / А. Семенов, Н. Соловьев, Е. Чернопрудова, А. Цыганков; Министерство образования и науки Российской Федерации, Федеральное государственное бюджетное образовательное учреждение высшего профессионального образования «Оренбургский государственный университет». - Оренбург: ОГУ, 2013. - 236 с.
4. Кудрявцев, В. Б. Интеллектуальные системы: учебник и практикум для бакалавриата и магистратуры / В. Б. Кудрявцев, Э. Э. Гасанов, А. С. Подколзин. — 2-е изд., испр. и доп. — М.: Издательство Юрайт, 2018. — 219 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 Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Industrial devices
Course Unit Code	ATMF-B07
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	5

Course Coordinator	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:
The Industrial Devices subject covers knowledge about the design, operating principles, technical characteristics, and control systems of devices used in various industrial fields. This subject provides students with fundamental and applied knowledge about the construction, operation, and maintenance of industrial equipment and automated systems.

Objectives of the Course:
To teach the operating principles and technical characteristics of industrial devices.
To provide knowledge about the design and operation of devices used in various industrial fields.
To understand and apply control systems (PLC, SCADA, etc.) that are important for industrial automation.
To explain the functions of sensors and actuators used in production.
To impart the knowledge required to ensure the maintenance and safety of industrial equipment.
To provide students with knowledge about the application of industrial robotics and IoT technologies.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Will be able to explain the operating principles and technical characteristics of industrial devices.	1, 2
2	Will be able to analyze and apply automated industrial control systems.	1, 2
3	Will understand and apply the role of sensors and actuators in industrial processes.	1, 2
4	Will explain the working mechanisms and application areas of hydraulic and pneumatic systems.	1, 2
5	Will analyze industrial robots and their application in production	1, 2
6	Will apply technical maintenance and safety standards of industrial devices	1, 2
7	Will be able to explain the uses and benefits of IoT and digital industrial technologies.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Introduction, main goals and objectives of the discipline, relationship with other disciplines. Characteristics of industrial devices	
2		Modern industrial devices, classification, general concept. Their characteristics, structure, components, working principles Seminar 1	
3		Effects resulting from mechanical and thermal effects. Piezoelectric effects. Pressure transducers. Pressure measurement methods	

4		Elements of theory. Spring pressure transducer. Volumetric method. Manometer method, electric distance manometer Seminar 2	
5		Thermoresistive effects. Temperature measuring devices and temperature converters. Thermoresistive method Metallic temperature transmitters. Thermomanometers	
6		Types of thermoresistors, materials used and basic reports. Seebeck effect Seminar 3	
7		Semiconductor thermoresistances. Thermoelectric method. Methodological errors of temperature sensors	
8		Galvanomagnetic and magnetoresistive devices. Hall effect. Devices based on Hall sensors Seminar 4	
9		Angular velocity, methods of measuring the angular velocity of shaft rotation. Devices for measuring the angular velocity of shaft rotation	
10		Tachogenerators and distance-measuring electric tachometers. Main faults of tachogenerators Seminar 5	
11		Alternating current tachogenerators. Digital tachometer, its advantages and disadvantages, error analysis	
12		Effects caused by the action of light rays. Brief information about radiation converters. Photoresistors Seminar 6	
13		Photo effect, laws. Photocells. Photometers	
14		Thermal radiation. General concepts. Complete radiation pyrometers or radiation pyrometers. Incomplete radiation pyrometers Seminar 7	
15		Radiation pyrometers with high-temperature parts. Thermal imaging devices and thermographs Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Nəbiyev R.N., Vəliyeva Q.C. Dozimetrik cihazlar və sistemlər. Bakı-2014, 164 səh.
2. V.İ. Nəsirov, E.V. Nəsirov, S.A. Səmədov, Elektrik dövrələrinin nəzəri əsasları. Bakı-2015.Dərs vəsaiti., 295 s.
3. Paşayev A.M., Hacıyev N.C., Nəbiyev R.N. Elektronikanın əsasları / Ali məktəblər üçün dərs vəsaiti. Bakı – 2002. 272 s
4. Əliyev Bayram Zeynal oğlu. Ümumi fizika kursu. Ali məktəblət üçün dərs vəsaiti. Bakı, Elm, 2010, 294 s.
5. B.D. Əliyev, Q.T. Həsənov. Ümumi fizika kursu. Ali məktəblət üçün dərs vəsaiti. Bakı, 2004, 660
6. Ocaqov H.O. Radiasiya və kimya kəşfiyyatı cihazları. Bakı, Azərnəşr, 1997
7. Məmmədov R.Q., Abbasov V.A. İnformasiyanın alınmasının fiziki əsasları. Dərslik, 2014, 480s.

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 Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Social Engineering
Course Unit Code	ATMF-B07
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	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 fact that the human factor plays an important role in ensuring the Information Security of production is now a universally recognized fact. Through the human factor, many subject hyperlinks of information security with the humanities and social sciences arise. Ensuring information security in the conditions of the information society, in addition to requiring new technological solutions, also poses a number of complex problems for the humanities and social sciences. In this work, the current problems of information security from the point of view of the humanities and social sciences are analyzed and a number of multidisciplinary research directions are identified. Taking all this into account, it is clear that the study of social engineering is important.

Objectives of the Course:

The goal and main objective of teaching the subject is to provide future specialists with relevant knowledge about "Social Engineering" and to create in them the ability to use this knowledge effectively in their work. The knowledge acquired will not only provide these specialists with knowledge in the field of information security, but will also be significantly needed in improving them.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Classification of threats in automated technical systems	1, 2
2	Cyberattacks on automated technical systems	1, 2
3	What is social engineering	1, 2
4	Principles of social engineering	1, 2
5	Security of social engineering	1, 2
6	Global Internet security	1, 2
7	Classical classification of security for information	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	2
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	2
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	2
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	2

5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	2
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	2
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	2
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Structure of automated technical systems	
2		Classification of hazards in automated technical systems Seminar 1	
3		Cyberattacks on automated technical systems	
4		Advanced Techniques and Manipulation Seminar 2	
5		"White hat" hacker attacks on technical systems	
6		Information security rules and privileged access management. Seminar 3	
7		Principles of information security	
8		Privileged Access Management Seminar 4	
9		Humanitarian aspects of information security	
10		Legal issues of information security Seminar 5	
11		Social engineering and its principles	

12		Social Engineering and Global Internet Security Seminar 6	
13		Social engineering is a method of gaining advantage over others and gathering information.	
14		Classical classification of security for information Seminar 7	
15		Principles of Social Engineering Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Rasim Əliquliyev, Yadigar İmamverdiyev. İnformasiya təhlükəsizliyinin humanitar aspektləri. AMEA İnformasiya Texnologiyaları İnstitutu (elmi məqalə) İnformasiya təhlükəsizliyinin multidissiplinar problemləri üzrə II respublika elmi-praktiki konfransı, 14 may 2015-ci il
2. H. Thompson, "The human element of information security," IEEE Security & Privacy, vol. 11, no. 1, pp. 32-35, Jan.-Feb. 2013.
3. R.M. Əliquliyev, Y. N. İmamverdiyev, F. F. Yusifov, "Cəmiyyətin informasiya təhlükəsizliyinə dair bəzi konseptual baxışlar," İnformasiya cəmiyyəti problemləri, №2(4), s.3-9, 2011.
4. R.M. Əliquliyev, Y. N. İmamverdiyev, "E-dövlətin informasiya təhlükəsizliyi: Aktual tədqiqat istiqamətləri: İnformasiya cəmiyyəti problemləri, 2010, №1, s. 3-13.

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 Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Digital Electronics
Course Unit Code	ATMF-BO8
Type of Course Unit	Elective
Level of Course Unit	3rd yeart
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	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:
For students studying with the approved curricula of the specialties “Mechatronics and Robotics Engineering”, the subject “Digital Electronics” is very important as a general vocational training subject. From a methodological point of view, it is appropriate to be guided by the principle of typology for studying the element base of modern digital devices. The essence of this principle is that instead of studying the entire variety of digital electronics elements belonging to a certain class, representatives reflecting the most stable features of this class are studied. At the same time, attention is paid to the theoretical provisions that form the basis of the operation of this or that element, technique. Such an approach creates a basis for mastering them in the conditions of dynamic development of electronic technology, along with the possibility of their implementation.

Objectives of the Course:
The subject is mainly taught in the teaching of simple and complex logic elements, triggers, counters and registers, combinational devices - encoders, decoders, adders, comparators, multiplexers, demultiplexers, etc., which are the basic elements of modern digital electronic technology, consisting of small and medium-sized integrated microcircuits. Typical elements, their circuits, working principles and practical application possibilities are taught. In order to master the subject, students will have acquired good knowledge for the subjects "Microprocessors" and "Programmable Logic Controllers" that they will study in the future, based on the knowledge they gained in the subjects "Analog Electronics", "Fundamentals of Measurement Techniques".

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	To achieve students' mastery of the principles of operation of modern microelectronic elements, microcircuit technology and modern devices based on them	1, 2
2	To teach the conventional designation of microelectronic devices and devices in circuits	1, 2
3	The circuit connection scheme of microcircuits	1, 2
4	The principle of operation of the device, including the basis of physical processes occurring in microcircuits	1, 2
5	The characteristic properties of microcircuits	1, 2
6	The main characteristics of microcircuits	1, 2
7	The normal and limit mode parameters of microcircuits	1, 2

8	The application areas and development prospects of microcircuits	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course’s Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		The purpose and content of the subject, the differences between analog and digital elements, analog and digital (discrete) signals. The switching mode of a transistor, switches built on bipolar and unipolar transistors.	

2		Logic levels, basic logic laws and axioms. Pulse signals, parameters and types. Digital integrated circuits, basic parameters and characteristics Seminar 1	
3		Methods of simplifying logical expressions. Canonical notation of logical expressions (minterm and maxterm notation). Simplification of multivariable logical equations based on Karnaugh diagrams. Grouping of neglected states on a Karnaugh map	
4		Simple logic elements: YES, NOT, AND, OR, signs, truth tables, implementations in integrated circuits, implementations in TTL-S and C-MOS technologies. Increasing the number of inputs of microcircuits and improving the load carrying capacity, the fate of the remaining inputs and elements of microcircuits in circuits Seminar 2	
5		Complex logic elements: NAND, NOR, symbols, truth tables, implementations in integrated circuits, full functionality sign, implementation of other logic functions in NAND and NOR elements. Increasing the number of inputs of microcircuits and improving the load carrying capacity, the fate of the remaining inputs and elements of microcircuits in circuits	
6		XOR, XNOR, AND-OR-NOT elements and logic expanders, their symbols, truth tables, and their implementation in integrated circuits. Seminar 3	
7		Memory elements-(bistable slots) triggers: asynchronous and single-cycle synchronous RS-triggers, single-cycle D-trigger, truth tables, symbols, functional schemes and algorithms; Two-cycle RS(MS) trigger, two-cycle D-trigger, two-cycle T-trigger, universal J-K-trigger, synthesis of trigger schemes	
8		Pulse counters, parameters and principles of construction, asynchronous (sequential transfer) addition and subtraction mode counters, reversible (Up-Down) counters, counter circuits in integrated circuits Seminar 4	
9		Synchronous (parallel transmission) counters Compulsory number coefficient counters - decade counters, arbitrary number coefficient counters, principles of construction of timer circuits. Frequency dividers, counter circuits in integrated microcircuits	
10		Registers, parameters, principles of construction, parallel and serial (shift) registers, circular counter circuits - Johnson counters. Universal reversible registers, principles and modes of operation, functional circuits, implementation in integrated circuits, code converters built in registers	

		Seminar 5	
11		Combinational devices: encoders, priority encoders, truth tables, algorithms and functional schemes, their expansion properties, encoders in integrated circuits. Decoders - linear decoder, truth table, algorithm and functional scheme, cascade and matrix decoders and their expansion properties, decoders in integrated circuits. Control unit of a 7-segment indication element	
12		Adders (summers) - binary half and full adders, multi-level adders - sequential with sequential transfer, parallel with serial transfer and parallel with parallel transfer adders; possibilities of expansion of adders Seminar 6	
13		Code comparison devices (comparators) - construction principles, simple binary comparator, multi-level comparators and their expansion possibilities	
14		Selector-multiplexers, circuit options, expansion features, implementations in integrated circuits and areas of application. Programming capabilities in multiplexers. Distributor-demultiplexers, circuit options, expansion features, implementations in integrated circuits and areas of application. Programming capabilities in demultiplexers. Seminar 7	
15		Analog-to-digital converters (ADCs), parameters, operating and construction principles: time-based discretization and level-based quantization, coding. Parallel-type ADCs. Opening-type ADCs, time-interval code converters, frequency-code converters, tracker-type ADCs. ADCs operating with the two-stroke integration method, analog-to-digital converters in integrated microcircuits	

Recommended Sources

TEXTBOOK(S)

1. Hümbətov R.T. Elektronika. I, II hissə, Dərs vəsaitləri Bakı. «Maarif» nəşriyyatı. 2010.
2. Ağayev F.H. Rəqəmsal elektronika. Mühazirələr konspekti. ADNSU-2022
3. Abdullayev A.A., Axundov A.Ə. Rəqəm elektronikasının əsasları. Tədris vəsaiti. Bakı. AzTU-nun nəşri. 1995. 166 s.
4. Mehmet Sait Türköz. ELEKTRONİK. İstanbul-2006, - 711s.

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 Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Electromagnetism
Course Unit Code	ATMF-BO8
Type of Course Unit	Elective
Level of Course Unit	3rd year

National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	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 "Electromagnetism" provides basic information about the basic laws of electromagnetism, methods of analyzing magnetic circuits, basic concepts of electric and magnetic circuits, operating principles of devices, properties, parameters, and their characteristics.

Objectives of the Course:
The goal and main objective of teaching the subject is to provide future specialists with relevant knowledge about "Electromagnetism" 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	Magnetic field and its characteristics	1, 2
2	Electrical and magnetic measuring devices	1, 2
3	Basic laws of magnetic circuits	1, 2
4	About dio-magnets	1, 2
5	About para-magnets	1, 2
6	Ferromagnetic materials	1, 2

7	Magnetic interaction of electric currents	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Electric charge and its basic properties. Electric field of a point charge. Principle of superposition of electric fields. Intensity vector flux. Ostrogradsky-Gauss theorem	

2		Electric dipole, dipole moment. Electric field of a dipole. Dielectrics. Dielectrics in an electric field. Polarization of dielectrics. Electric induction vector. Gauss' theorem for the electric induction vector Seminar 1	
3		Conductors in an electric field. Capacitance of a single wire and a capacitor. Energy of a dipole in an electric field. Energy of a charged wire, capacitor and electric field. Volumetric energy density	
4		Magnetic field and its characteristics Seminar 2	
5		Magnetic circuits. Basic laws of magnetic circuits	
6		Magnetic induction. Graphic representation of the magnetic field. Biot-Savart-Laplace law. Superposition principle. Applications of Biot-Savart-Laplace law Seminar 3	
7		Magnetic field of electric current. Magnetic interaction of electric currents	
8		Magnetic induction vector flux. Gauss's theorem for the magnetic field. Circulation of the magnetic induction vector. The law of total current in a vacuum Seminar 4	
9		The effect of a magnetic field on a current-carrying wire. Ampere's law. A current-carrying wire in a uniform and non-uniform magnetic field. Work done when a current-carrying wire and a current-carrying wire move in a magnetic field	
10		The effect of a magnetic field on a moving charge. Lorentz force. Hall effect. Relativity of electric and magnetic fields Seminar 5	
11		Magnetic field in the environment. Magnetization vector. Relationship between magnetic field intensity and induction. Dia- and paramagnetics. Ferromagnets and their properties. Magnetic hysteresis phenomenon	
12		Mutual magnetic effect of current-carrying wires. Characteristics of the magnetic field. Biot-Savart-Laplace law Seminar 6	
13		Circulation of the magnetic field intensity vector. Full current law	
14		Electromagnetic induction phenomenon. Lenz's rule. Induction e.h.q. Self-induction. Inductance Seminar 7	

15		Magnetic field in the environment. Magnetization vector. The relationship between magnetic field inductance and induction Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. V. Nəsirov, G. Aslanov Elektrik və maqnetizm “Adiloğlu” Bakı 2008
2. Friş S.A. Timoryeva A.N. Ümumi fizika kursu. II hissə 1962
3. Abdullayev Y.R. “Elektrik və elektron aparatları” Bakı, Hərbi nəşriyyat, 1999 (II hissə)
4. Kalaşnikov S. Q. Elektrik bəhsi. Bakı,2010. 3. A.O. Mehrabov, G.Ə. Quliyeva,
5. Z.M. Babayev Ümumi fizika kursu “Çaşıoğlu” Bakı 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	**120**
Total Workload/30(h)	**120/30**

ECTS Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Physical Principles of Obtaining Information, Modern Sensors and Converters
Course Unit Code	ATMF-B08
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	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 "Physical foundations of information acquisition, modern sensors and converters" belongs to the block of general technical subjects. This subject is dedicated to the study of the theory, principles of construction, design and operation of converters and devices intended for collecting primary information, forming control commands and conducting control.
Objectives of the Course: The main goal of teaching the subject "Physical Basis of Information Acquisition, Modern Sensors and Converters" is to provide future device engineers with information about the physical nature of converters and sensors, which are the primary source of information acquisition, their operating principles, the creation of their basic circuits, their errors and ways to reduce errors, and to instill the ability to effectively use the knowledge they have acquired during the course.
Learning Outcomes

At the end of the course the student will be able to		Assessment
1	The goal of teaching the subject is to achieve the main goal set during the course, to fulfill the intended tasks at a high level, to train educated and skilled professionals, and to educate a patriotic young generation.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4

9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Subject of the subject, general information, physical foundations of information acquisition, modern sensors and transducers, basic concepts of the subject	
2		Theory of errors of devices. errors, types, general concepts. Measured parameters. Measurement, units of measurement of physical quantities Seminar 1	
3		Measurement converters, concepts and definitions. Measuring instruments. Measurement methods, types, classification. General information about signals. Types and characteristics of signals. Signal conversion	
4		Basic concepts of errors. Methodological and instrumental errors. Rules for ensuring a unified measurement system in the assessment of errors Seminar 2	
5		Pressure sensors. Methods of measuring pressure. Elements of theory. Spring pressure sensor. Electric distance manometers	
6		Effects resulting from mechanical and thermal effects. Effects resulting from mechanical, thermal, spatial and temporal effects Effects resulting from mechanical and thermal effects Seminar 3	
7		Pressure measurement methods. Volumetric method. Manometer method. Piezoelectric effects. Pressure transducers	
8		Galvanomagnetic, magnetoresistive and thermoresistive effects, temperature transducers Seminar 4	
9		Types of thermoresistors, materials used and basic reports. Seebeck effect. Semiconductor thermoresistors	
10		Thermoelectric method. Methodological errors of temperature sensors	

		Seminar 5	
11		Galvanomagnetic and magnetoresistive effects. Hall effect. Hall sensors. Metallic temperature sensors. Thermomanometers. Transformer converters	
12		Simple transformer displacement converter. Differential circuit of a transformer displacement converter. Moving coil transformer converter Seminar 6	
13		Transformer-driven displacement converters	
14		Radiation and thermal radiation converters Radioactive radiation converters Seminar 7	
15		Radioactive isotopes used in measurement techniques. Ionizing radiation detectors. Gas discharge counters. Scintillation counters. Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Q.Ə. Rüstəmov. Siqnalların rəqəmli emalı. Mühazirələr konspekti. Dərs vəsaiti. Bakı, AzTU. 2016, 294 s
2. R.N. Nəbiyev İnformasiyanın alınmasının fiziki əsasları. Ali məktəb tələbələri üçün dərslik. Bakı, 2016-cı il, 240 səh.
3. Paşayev A.M., Hacıyev N.C., Nəbiyev R.N. Elektronikanın əsasları / Ali məktəblər üçün dərs vəsaiti. Bakı – 2002, 272 c.
4. Məmmədov R.Q., Həsənov T.Ə., Abbasov V.A., Məmmədov U.Q. İnformasiyanın alınmasının fiziki əsasları. Dərslik, 2014. 480 səh.
5. Земляков В.В, Панич А.Е. Физические основы получения информации. Учеб. пособ. Ростов на Дону, 2010, 132 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 Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Mechanics of Manipulator Mechanisms
Course Unit Code	ATMF-B09
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2

Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	6
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 main requirements set for the course “Mechanics of Manipulator Mechanisms” are formed. Among them is the fact that the course is aimed at the development of methodological and worldview. Students learn about the strength, rigidity and durability of the surrounding world and the elements of manipulator mechanisms. The main issues of the subject are the development of methods for calculating the strength, rigidity, rigidity of parts.

Objectives of the Course:
The main goal of the course is to enable students to independently use the knowledge gained during the lectures in solving practical problems. A manipulator is a technical device that can perform the working function of a human arm and hand. A manipulator is also an executive mechanism of an industrial robot, which is a mechanism provided with the necessary transmission and executive body. “Mechanics of manipulator mechanisms”, as the name suggests, studies the structure of the materials of the mechanism’s components and the structural changes that occur in them. The practical part of the course involves the application of theoretical knowledge and the improvement of skills and habits when working with students.

Learning Outcomes

	At the end of the course the student will be able to know	Assessment
1	Equations of motion in displacements. Lemma equations - Slip. Pure slip. Hooke's law in pure slip. The dependence formula between the three elastic constants	1, 2
2	Longitudinal and transverse oscillations in an unbounded elastic medium	1, 2
3	Planar deformation	1, 2
4	Planar stress state	1, 2
5	Generalized plane stress state	1, 2

6	Elastic stress function	1, 2
7	General equations of the plane problem in polar coordinates	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Components of a manipulator. Structural synthesis of manipulators	

2		About Porous Materials Seminar 1	
3		Theoretical study of the physical properties of porous materials in contact with liquids	
4		Elements of Vector Algebra Seminar 2	
5		Matrices	
6		Determinant Seminar 3	
7		Elements of tensor calculus	
8		Basis vectors Seminar 4	
9		Addition, subtraction, and multiplication of tensors	
10		Covariant component of an arbitrary vector Seminar 5	
11		Fundamental metric tensor	
12		Tensions Seminar 6	
13		Major tensions, major issues	
14		Differential equations of motion of a body Seminar 7	
15		Relationship between deformations and displacements Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Биргер И.А., Мавлютов Р.Р. Сопротивление материалов М., Наука 1986 С: 560
2. Регель В.Р., Слуцкер А.И., Томашевский Э.Е. Кинетическая природа прочности твердых тел. - М.: Наука, 1974,- 560 с.
3. Степанов В.А., Шпейзман В.В., Козачук А.И. Кинетика разрушения твердых тел, ее особенности и возможности прогнозирования для различных режимов нагружения // Физика разрушения. Киев: ИПМ АН УССР, - 1980, - Ч. 1.- с. 8-10.
4. Косторнов А.Г. Пористые проницаемые материалы: научные основы формирования

структуры и свойств, опыт изготовления и эффективного применения // Порошковая металлургия. - 1995.- №11/12- с. 24-41		
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)	**150/30**
ECTS Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Optical Information Systems
Course Unit Code	ATMF-B09

Type of Course Unit	Elective
Level of Course Unit	3^{rd} year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	6
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 "Optical Information Systems" belongs to the block of general technical subjects. The teaching and learning of the course covers the topics of information, concepts of information and data, information transmission, discrete and continuous information, information process, types, properties and classification, concepts of objectivity and subjectivity of information and forms of presentation, and optical information systems.

Objectives of the Course:
The main goal of teaching the subject is to instill in future specialists the relevant knowledge about "Optical Information Systems" and to create the ability to effectively use the knowledge they have acquired during the course. At the same time, they should be able to use various devices, information-measuring systems and complexes, their working principles, and various types of electronic, optoelectronic, etc. devices to control and manage processes. The knowledge gained will significantly help these specialists in their future work activities.

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	To create a foundation for general engineering training in students, to instill the ability to use the theoretical knowledge they have acquired from the Optical Information Systems course in any industrial sector, organization, department, enterprise, or association that corresponds to their professional and qualification	1, 2

	level, and to apply it in future educational stages in compliance with existing regulations.	
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	3
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	3
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Subject, main concepts and issues of the subject. Information. Concept of information and data. Transfer of information	

2		Discrete and continuous information. Information processes. Types, properties, classification of information. Concepts of objectivity and subjectivity of information. Forms of information presentation. Seminar 1	
3		Structure and kinematic properties of optical information systems	
4		Information Systems and Technologies. The Role of ICT in the Formation of Knowledge and Skills Seminar 2	
5		Structure and kinematic properties of optical information systems ICT and education. The main goal of building an information society	
6		Monitoring the development direction of information and communication technologies Seminar 3	
7		Development Concept and National Strategy. ICT infrastructure. Information security	
8		Information Security. Electronic Government. Regional Projects. Space Industry and Satellite Broadcasting. Personnel Training and ICT Literacy Seminar 4	
9		Statistical classification of information and communication technology products. Information and communication technologies. Classification of products	
10		Statistical classification of information and communication technology products. Information and communication technologies. Classification of products Seminar 5	
11		Fiber-optic telecommunications. The Information Age	
12		Steps in the process of establishing communication using fiber optics. Fiber optic cable Seminar 6	
13		Types of fiber cable. Transmission windows. Fiber optic transmission of security and surveillance solutions	
14		Visual information, its importance and essence. Analogue information carriers Seminar 7	
15		Photosensitive Materials Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Future Trends in Fiber Optics Communication" (PDF). WCE, London UK. July 2, 2014.
2. Alcatel-Lucent. September 28, 2009. October 18, 2009 tarixində orijinalından arxivləşdirilib.
3. "Guide to Fiber Optics & Permises Cabling". The Fiber Optics Association. İstifadə tarixi: December 22, 2015.
4. Azərbaycan Respublikası Prezidenti yanında Vətəndaşlara Xidmət və Sosialİnnovasiyalar üzrə Dövlət Agentliyi, İnformasiya-kommunikasiya texnologiyalarısahəsində hüquqi aktlar, http://vxsida.gov.az/redirect/index/cat_id/83/MainOrNot/0"Alcatel

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)	**150/30**
ECTS Credit of the Course	**4**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Mechanical Engineering
Course Unit Code	ATMF-BO9
Type of Course Unit	Elective
Level of Course Unit	3^{rd} year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	6
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 subject teaches materials on the peculiarities of machine production; the purpose, structure, and performance characteristics of technological processes; evaluation of output parameters of technological processes; principles of operation of technological equipment, the laws that operate between technological system elements, and the rules for using these laws in the management of technological processes.

Objectives of the Course: The main goal of teaching the subject is to provide students with basic knowledge of the features of ensuring the production quality of machines and their parts and the laws that affect their manufacturing processes, and to develop in them the skills to manage technological processes based on the theoretical knowledge they have acquired. The subject of "Machine Manufacturing Technology" plays a great role in the training of engineering personnel.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Students' mastery of materials on the purpose, structure, and features of their implementation of technological processes in machine production	1, 2
2	Formation of general knowledge in students on the production of machines and their parts	1, 2
3	Familiarization with the laws of interaction between technological system elements and the structure of the rules for using these laws in the management of technological processes	1, 2
4	Investigation of the constructions and production processes of machines and their parts and study of the characteristics of identifying and managing factors affecting the formed quality	1, 2
5	Evaluation of technological parameters, efficiency of various processes, study of the features of ensuring the reliability of the technological process	1, 2
6	Performance of practical tasks used in the field of machine production for students studying at the bachelor's level	1, 2
7	Control and investigation of the level of implementation of practical tasks	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5

6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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. Introduction. Basic concepts. Fundamentals of machine part design	
2		Topic No. 2. Performance criteria of machine parts. Strength. Hardness. Wear resistance Seminar 1	
3		Topic No. 3. Reliability of machine parts	
4		Topic No. 4. Materials used in mechanical engineering Seminar 2	
5		Topic No. 5. Technological requirements for machine parts	
6		Topic No. 6. Threaded connection Seminar 3	
7		Topic No. 7. Welding joint	
8		Topic No. 8. Rivet joint Seminar 4	
9		Topic No. 9. Shaft – groove type guaranteed – tension installation	
10		Topic No. 10. Joints with joints, joints and profiles Seminar 5	
11		Topic No. 11. Mechanical transmissions. Belt transmission	
12		Topic No. 12. Worm gear. Novikov gear Seminar 6	
13		Topic No. 13. Planetary gear transmission and reducers	

14		Topic No. 14. Optimization of mechanical transmissions and their calculation on the computer Seminar 7	
15		Topic No. 15. Axles, Shafts, Bearings, Couplings and Springs Seminar 8	

Recommended Sources

TEXTBOOK(S)

1. Rəsulov N.M. Maşın istehsalı texnologiyası. Dərslik, Bakı, Təhsil, NPM, 2010, 432 s
2. Kərimov Z. H. Maşın hissələri və yükqaldırıcı – nəqledici maşınlar. Ali texniki məktəblər üçün dərslik. II nəşri – Bakı, 2002, 596 səh.

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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Programming and Information Security"

Course Unit Title	Modern Programming Languages
Course Unit Code	ATMF-B10
Type of Course Unit	Elective
Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Elvin Gurbanov
Name of Lecturer (s)	Elvin Gurbanov
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 modern programming languages covers familiarity with modern programming languages and tools, as well as their theoretical and practical aspects. Through this subject, students learn the basic concepts of programming and the construction of algorithms. The subject provides an opportunity to master the methods used in solving real problems by working on practical tasks and projects. At the same time, stages such as software design, development and testing are also taught in depth. As a result, this subject provides students with analytical thinking, creative approach and professional skills, paving the way for them to become specialists offering competitive software solutions in the future.

Objectives of the Course: The aim of the Modern Programming Languages course is to teach students the basic principles of programming and to familiarize them with modern programming languages. Within the course, various programming tools and methods are explained through practical examples. Students develop their analytical thinking and creative skills by applying effective approaches to solving real problems. This knowledge lays the foundation for their success in various technological fields. As a result, the course aims to train students as programmers who can create competitive and innovative solutions.		
Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	Students will deeply master the basic concepts and methods of programming	1, 2
2	They will gain the ability to develop programs aimed at solving real problems using various programming languages and tools	1, 2
3	They will develop theoretical and practical knowledge in building and optimizing algorithms	1, 2
4	Analytical thinking, critical evaluation and creative approach skills will be formed	1, 2
5	They will improve skills in team collaboration and project management	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	3

8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	5
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 Programming. Definition and importance of programming Types of programming languages and brief information on modern languages (Python, JavaScript, Java, etc.)	
2		LECTURE 2 Variables and Data Types. Variables and their definition. Basic data types: Numeric (integer)	
3		LECTURE 3 Integer type data. Real type data. Symbol type data. Logical type data. Arithmetic, unary, binary operations. Explicit and implicit conversion of types Constants. Variables. Constants and their types. Binary, octal, hexadecimal constants. Symbol type constants. Variables and their declaration. Initialization of variables. Dynamic initialization.	
4		LECTURE 4 Variables and Data Types. Variables and their definition. Basic data types: Numeric (float)	
5		LECTURE 5 Text (string) Boolean. Operators: Arithmetic operators. Comparison operators. Logical operators Assignment operator. Type conversion. How the assignment operator works. Multiple assignment operations in the same assignment operator. Shorthand notation for the assignment operator. Type conversion in the assignment operator	
6		LETURE 6 Classes, objects, methods. Object class. static service keyword. Basic elements of object-oriented programming. General form of class definition	
7		LECTURE 7 Creating classes. Accessing class members. public, private, protected specifiers. Declaring methods. Creating objects. Object class. Methods of Object class. Using static service.	

		Conditional Operators and Conditions. If-Else conditional blocks	
8		LECTURE 8 Multiple conditional operators (elif/switch-case, if any). Conditional expressions and short conditional notation (ternary operators)	
9		LECTURE 9 Loops and Iteration. For. While Do While Compiling programs using the For loop operator	
10		LECTURE 10 Compiling programs using the While Do loop operator	
11		LECTURE 11 Functions and Module Creation Function definition and calling. Parameters and return values Local and global variables. Organizing functions as modules and libraries. Basics of recursion (function calling itself)	
12		LECTURE 12 Structured data types. Arrays. Strings. One-dimensional arrays. Two-dimensional arrays. Multidimensional arrays. Defining arrays as objects	
13		LECTURE 13 Steps to create an array. Declaring an array. Allocating memory for an array. Defining strings. Object of type string. Methods of the string class. Fundamentals of Data Structures. Arrays and lists. Simple operations of data structures (add, delete, search)	
14		LECTURE 14 Objects. Lecture outline. Objects. Basic concepts. Object handling in Python	
15		LECTURE 15 Event sources. Event sinks. Event sink interfaces. Event delegation model and its implementation Event categories. Mouse-related events. Keyboard-related events. User-initiated events	

Recommended Sources

TEXTBOOK(S)

1. Kernighan, B. W., & Ritchie, D. M. – "The C Programming Language" (2-ci nəşr)
2. C proqramlaşdırma dilinin əsas prinsipləri, sintaksisi və strukturlaşdırılmış proqramlaşdırma metodları ətraflı izah edilir.
3. Aho, A. V., Lam, M. S., Sethi, R., & Ullman, J. D. – "Compilers: Principles, Techniques, and Tools"
4. Kompilyatorların işləmə mexanizmləri, dil təhlili və alqoritm dizaynı mövzularını əhatə edir.
5. Zelle, J. – "Python Programming: An Introduction to Computer Science"
6. Python dilinə giriş və proqramlaşdırmanın əsas konsepsiyalarını praktik nümunələrlə izah edir.
7. Cormen, T. H., Leiserson, C. E., Rivest, R. L., & Stein, C. – "Introduction to Algorithms"
8. Alqoritmlərin dizaynı və təhlili üzrə fundamental məlumatlar təqdim olunur.

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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of “Information Technologies”

Course Unit Title	Cloud Technology
Course Unit Code	ATMF-B10
Type of Course Unit	Elective

Level of Course Unit	3rd year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Sama Bayramova Gadir
Name of Lecturer (s)	Sama Bayramova Gadir
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Tələbələrdə müvafiq bilik, bacarıq və vərdişlərlərin formalaşdırılması, onların kompüterdə iş hazırlığının təmin edilməsi.

Objectives of the Course:
The purpose of the subject "Cloud Technologies" is to study the characteristics of the formation of cloud technology, development trends and prospects in the world, and to use this technology in Azerbaijan by identifying the directions for improving this technology in accordance with international experience. To achieve the set goal, the following issues were considered in the work:
• The essence of the concept of cloud technology;
• The main platforms using the cloud;
• To examine the positive and negative aspects of the service.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	• storage-as-a-service; • database-as-a-service; • information-as-a-service; • security-as-a-service; • management/governance-as-a-service; • remote management of other cloud services;	1, 2

	• testing-as-a-service.	
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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.** Theoretical and methodological foundations of the formation of cloud technology **Seminar 1**	
2		**Topic No. 2.** The essence of cloud technology	

3		**Topic No. 3.** The history of cloud technology **Seminar 2**	
4		**Topic No. 4.** Overview of Cloud Products	
5		**Mövzu № 5.** IBM Blue Cloud **Seminar 3**	
6		**Mövzu № 6.** Joyent Accelerator	
7		**Topic No. 7.** Microsoft Azure **Seminar 4**	
8		**Topic No. 8.** Overview of the Windows Azure platform	
9		**Topic No. 9.** Key Benefits and Features of the Windows Azure Platform **Seminar 5**	
10		**Topic No. 10.** Cloud platform components	
11		**Topic No. 11.** Virtual machines **Seminar 6**	
12		**Topic No. 12.** Cloud services	
13		**Topic No. 13.** Windows Azure Mobile Services Functionalities **Seminar 7**	
14		**Topic No. 14.** Pros and cons of cloud technology	
15		**Topic No. 15.** Development prospects of cloud technology **Seminar 8**	

Recommended Sources

TEXTBOOK(S)

1. Mell P., Grance T. The NIST definition of cloud computing, 2010, www.nist.gov/itl/cloud/upload/cloud-def-v15.pdf
2. Ələkbərov R.Q., Həşimov M.A. azsciencenet şəbəkəsində cloud computing texnologiyalarının tətbiqi perspektivləri haqqında // İnformasiya texnologiyaları problemləri, 2012, №2, s. 30–36.
3. Ələkbərov R.Q., Həşimov M.A., Mustafayev T.İ. Cloud computing xidmətinin təhlükəsizlik məsələləri və onların həlli yolları // İnformasiya texnologiyaları problemləri, 2014, №2, s.
4. Soleimanian F., Hashemi S. Security Challenges in Cloud computing with More Emphasis on Trust and Privacy // International Journal of Scientific & Technology Research, 2012, vol.1, no.6, pp. 49–5

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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	IoT Technologies
Course Unit Code	ATMF-B10
Type of Course Unit	Elective
Level of Course Unit	3rd year

National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Həmidova Rəqsanə Eyvaz
Name of Lecturer (s)	Həmidova Rəqsanə Eyvaz
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject covers theoretical and practical knowledge of electrical circuits, microchips and microcontrollers, network protocols, IoT devices and their security. Students will also gain skills in network security, data encryption, and vulnerability detection in IoT networks. The aim of the subject is to train students as experienced and specialized professionals in both the fields of electronics and network security.

Objectives of the Course:

- Electronics Fundamentals: Electrical circuits, electronic components (resistor, capacitor, transistor), operating principles of microchips and microcontrollers, and practical projects.
- IoT Security: Building IoT devices and networks, network protocols (e.g., MQTT, HTTP), network security (encryption, firewall, VPN), and identifying security vulnerabilities.
- Network and communication protocols: Networking (router, switch, VLAN), connecting IoT devices to the network, and securely transmitting data.
- Integration: Integrating electronic components into IoT networks and ensuring security.

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	Understanding the working principles of electronic components	1, 2
2	Explaining the functions of microchips and microcontrollers	1, 2
3	Network building and management skills	1, 2

4	Identifying security vulnerabilities in IoT networks and implementing defense measures	1, 2
5	Ensuring network security	1, 2
6	Defending skills against attacks	1, 2
7	Understanding the integration of electronics and IoT security	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	5
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	5
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 Electrical circuits, Ohm's law, basic components (resistor, capacitor, transistor, etc.)	
2		LECTUE 2 Types and functions of electronic components (resistors, capacitors, transistors, diodes)	
3		LECTURE 3 Microchips and Microcontrollers: Structure and Function	
4		LECTURE 4 Network architecture, protocols, IP addressing, subnetting, and network devices	
5		LECTURE 5 Working principles of router and switch devices, their role in the network	
6		LECTURE 6 What is IoT (Internet of Things), principles of construction and operation of IoT devices	
7		LECTURE 7 MQTT, HTTP and other IoT protocols; data exchange between IoT devices	
8		LECTURE 8 Security vulnerabilities, threats and weak points in IoT networks	
9		LECTURE 9 Network security principles, firewalls and protection against network attacks	
10		LECTURE 10 Encryption methods (symmetric and asymmetric), SSL/TLS, VPN	
11		LECTURE 11 Use of Virtual Private Networks (VPNs) and IPsec protocols in IoT networks	
12		LECTURE 12 DDoS attacks, vulnerability analysis and penetration testing	
13		LECTURE 13 IoT network monitoring, network traffic and performance analysis	
14		LECTURE 14 Integration of electronic components into IoT networks, application of security methods	
15		LECTURE 15 IoT network construction, network security implementation, and device integration	

Recommended Sources

TEXTBOOK(S)

1. Sedra, A. S., & Smith, K. C. (2004). Microelectronic Circuits (5th ed.). Oxford University Press.
2. Nilsson, J. W., & Riedel, S. A. (2019). Electric Circuits (11th ed.). Pearson.
3. Morris, R. J. (2006). Introduction to Electronics. McGraw-Hill Education.
4. Stallings, W. (2017). Network Security Essentials: Applications and Standards (6th ed.). Pearson.
5. Kurose, J. F., & Ross, K. W. (2017). Computer Networking: A Top-Down Approach (7th ed.). Pearson.

6. Tanenbaum, A. S., & Wetherall, D. J. (2013). Computer Networks (5th ed.). Prentice Hall.
7. Vijayakumar, V., & Prasad, P. R. (2018). Internet of Things: Security and Privacy Issues. Wiley-IEEE Press.
8. Hollis, J. D. (2015). Practical Electronics for Inventors (4th ed.). McGraw-Hill.
9. Grobe, M., & Rieback, M. (2019). Internet of Things: IoT Security and Privacy.
10. Garcia, R., & Mohamed, A. (2017). Cybersecurity for the Internet of Things (1st ed.). CRC 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	**150**
Total Workload/30(h)	**150/30**
ECTS Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Quality Control and Metrology
Course Unit Code	ATMF-B11
Type of Course Unit	Elective
Level of Course Unit	4^{th} year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	4
Semester when the course unit is delivered	7
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 course "Quality Control and Metrology" consists of theoretical lessons and laboratory exercises. The course reviews the main issues of metrology science, provides basic information about measurements, measuring instruments and their characteristics. It is clear that studying the course "Quality Control and Metrology" is important.

Objectives of the Course:
The course is considered a key tool in preparing students for the field of metrology, standardization and quality management, as well as for the design and operation of measuring instruments. The knowledge acquired will not only provide these specialists with knowledge in the field of "Quality control and metrology", but will also be significantly needed to improve them.

Learning Outcomes

At the end of the course the student will be able to know		Assessment
1	The essence and main characteristics of measurements	1, 2
2	Classification of measuring instruments	1, 2
3	Detection and elimination of systematic errors	1, 2
4	Reliability of measuring instruments	1, 2
5	Evaluation of the result and error of direct measurement carried out with multiple observations	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Basic terms and concepts of metrology. Physical properties of quantities and scales Seminar 1	
2		Physical quantities and their system of units. International system of units Seminar 2	
3		Representation of physical quantity units and their measurements. System units and standards Seminar 3	
4		The model of measurement and the basic postulates of metrology Seminar 4	
5		Measurement errors. Measurement quality Seminar 5	
6		Methods of processing measurement results. Dynamic measurements and dynamic errors Seminar 6	
7		Normalization of metrological characteristics of measuring instruments. Types of measuring instruments Seminar 7	
8		Metrological characteristics of measuring instruments. Accuracy classes of measuring instruments Seminar 8	
9		Normalization models of metrological characteristics. Normalization of dynamic errors of measuring instruments Seminar 9	
10		Metrological reliability of measuring instruments. Concepts of verification and control. Principles of metrological assurance. Fundamentals of metrological assurance Seminar 10	
11		State Committee for Standardization, Metrology and Patents of the Republic of Azerbaijan. State metrological control and inspection. Seminar 11	
12		Metrological certification of measuring instruments and testing equipment. Seminar 12	
13		Implementation of standards. State control over standards and sanctions for violation of their requirements Seminar 13	
14		Measuring instruments certification system. The essence and content of certification. Basic terms and concepts Seminar 14	

15		Metrological expertise. Analysis of the state of measurement. The essence of compulsory and voluntary certification. National certification system AZS Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. N.H. Fərzanə., H.C. Cəfərov, C.M. Abbasova. “Metrologiyanın əsasları”
2. Преображенский В.П. Теплотехнические измерения и приборы. М. Энергия 1978.
3. Рабинович С.Г. Погрешности измерений. – Л. Энергия. 11978
4. Фарзане Н.Г., Илясов Л.В., Азимзаде А.Ю. Технологические измерения и приборы. – М. Высщая школа, 1989.
5. Məmmədov N.R. Sertifikatlaşdırmanın əsasları, Dərs vəsaiti. – Bakı, Elm, 2001
6. AZS Milli sertifikatlaşdırma sistemi. Rəhbəredici sənədlərin məcmusu-1 hissə, Bakı: Azərdövlətstandart, 1993.

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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Measurement Technologies
Course Unit Code	ATMF-B11
Type of Course Unit	Elective
Level of Course Unit	4^{th} year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/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 "Measurement Technologies" belongs to the block of general technical subjects. The subject "Measurement Technologies" is intended for all technical specialties of the modern era. Bachelors trained in technical directions in higher education institutions will be able to study in detail the issues of improving the quality and achieving the required accuracy during the design, production technology and operation of devices by mastering the subject "Measurement Technologies".		
Objectives of the Course: The main goal of teaching the subject is to instill in future specialists the relevant knowledge about "Measurement technologies" and to create the ability to effectively use the knowledge they have acquired during the course. The knowledge acquired will significantly help these specialists in their future work activities		
Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	The main goal set in teaching the subject is to achieve a high level of achievement and to train highly knowledgeable, skilled specialists and patriotic personnel.	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4

9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Introduction to the subject, the role of measurement technology, measuring devices and systems, development directions Seminar 1	
2		Basic concepts and definitions of measurements. Basic stages of measurement Seminar 2	
3		Physical quantity. Unit of physical quantity Seminar 3	
4		The amount of information. Entropy Seminar 4	
5		Measurement information signals Seminar 5	
6		Measuring Instruments, Characteristics of Measuring Instruments Seminar 6	
7		Types and methods of measurements Seminar 7	
8		Types and methods of measurements Seminar 8	
9		Bridge measurement schemes Seminar 9	
10		Compensation Measurement Methods Seminar 10	
11		Measuring devices Seminar 11	

12		Magnetic Materials Seminar 12	
13		Information-Measurement Systems Seminar 13	
14		Measurement Systems Seminar 14	
15		Virtual information, intelligent and telemetry measurement systems Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. N.H. Fərzanə., H.C. Cəfərov, C.M. Abbasova. “Metrologiyanın əsasları”
2. Преображенский В.П. Теплотехнические измерения и приборы. М. Энергия 1978.
3. Рабинович С.Г. Погрешности измерений. – Л. Энергия. 11978
4. Фарзане Н.Г., Илясов Л.В., Азимзаде А.Ю. Технологические измерения и приборы. – М. Высщая школа, 1989.
5. Məmmədov N.R. Sertifikatlaşdırmanın əsasları, Dərs vəsaiti. – Bakı, Elm, 2001
6. AZS Milli sertifikatlaşdırma sistemi. Rəhbəredici sənədlərin məcmusu-1 hissə, Bakı: Azərdövlətstandart, 1993.

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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Metrology, Standardization and Certification
Course Unit Code	ATMF-B11
Type of Course Unit	Elective
Level of Course Unit	4th year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	4
Semester when the course unit is delivered	7
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 course "Metrology, Standardization and Certification" consists of theoretical lessons and laboratory exercises. The course reviews the main issues of metrology science, provides basic information about measurements, measuring instruments and their characteristics. It is clear that studying the course "Metrology, Standardization and Certification" is important.

Objectives of the Course:
The course is considered a key tool in the training of students in the field of metrology, standardization and quality management, as well as in the design and operation of measuring instruments.
The knowledge acquired will not only provide these specialists with knowledge in the field of "Metrology, standardization and certification", but will also be significantly needed in improving them.

Learning Outcomes

	At the end of the course the student will be able to know	Assessment
1	The essence and main characteristics of measurements	1, 2
2	Classification of measuring instruments	1, 2
3	Detection and elimination of systematic errors	1, 2
4	Reliability of measuring instruments	1, 2
5	Evaluation of the result and error of direct measurement carried out with numerous observations	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4

4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Basic terms and concepts of metrology. Physical properties of quantities and scales Seminar 1	
2		Physical quantities and their system of units. International system of units Seminar 2	
3		Representation of physical quantity units and their measurements Seminar 3	
4		Units and standards of the system Seminar 4	
5		The measurement model and the basic postulates of metrology Seminar 5	
6		Measurement Errors Seminar 6	
7		Quality of Measurement Seminar 7	

8		Methods of processing measurement results Seminar 8	
9		Dynamic Measurements and Dynamic Errors Seminar 9	
10		Types of measuring instruments Seminar 10	
11		Understanding of standardization. Basic terms of standardization. State control over standards and sanctions for violation of their requirements Seminar 11	
12		The essence and content of certification. Basic terms and concepts Seminar 12	
13		The essence of compulsory and voluntary certification Seminar 13	
14		National certification system AZS. Main provisions Seminar 14	
15		Certification in foreign countries Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. N.H. Fərzanə., H.C. Cəfərov, C.M. Abbasova. “Metrologiyanın əsasları”
2. Преображенский В.П. Теплотехнические измерения и приборы. М. Энергия 1978.
3. Рабинович С.Г. Погрешности измерений. –Л. Энергия. 11978
4. Фарзане Н.Г., Илясов Л.В., Азимзаде А.Ю. Технологические измерения и приборы. – М. Высшая школа, 1989.
5. Məmmədov N.R. Sertifikatlaşdırmanın əsasları, Dərs vəsaiti. – Bakı, Elm, 2001
6. AZS Milli sertifikatlaşdırma sistemi. Rəhbəredici sənədlərin məcmusu-1 hissə, Bakı: Azərdövlətstandart, 1993.

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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Computerized Biomedical Devices
Course Unit Code	ATMF-B12
Type of Course Unit	Elective
Level of Course Unit	4^{th} year
National Credits	

Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	4
Semester when the course unit is delivered	7
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 “Computerized Biomedical Devices” is one of the specialized subjects taught to students studying at the bachelor's level in the specialty “Mechatronics and Robotics Engineering”. The subject studied examines the structure and composition of computerized medical complexes. In addition, the working principle of computerized devices is analyzed and their impact characteristics are determined. In this regard, the teaching of the subject in question is relevant.

Objectives of the Course:
The purpose of "Computerized Biomedical Devices" is to investigate the development prospects of computerized medical devices and systems for undergraduate students in the "Mechatronics and Robotics Engineering" specialty, and to study the structure of computerized medical complexes and their working principles.

Learning Outcomes

	At the end of the course the student will be able to know	Assessment
1	Structure and composition of computerized medical complexes	1, 2
2	Basic principles of processing medical signals by microprocessors	1, 2
3	Computerized electrocardiographic complexes	1, 2
4	Multichannel computerized electromyograph. Electrostimulation methods	1, 2
5	Methods of measuring and processing brain biopotentials, computerized multichannel systems	1, 2
6	Computerized device for measuring blood pressure. Microprocessor-controlled arterial tonometer	1, 2
7	Computerized electrooculograph	1, 2

8	Hearing sensor system. Computerized impedancemetry	1, 2
9	Structure and principle of operation of Dopplerography device	1, 2
10	Computerized device for measuring respiratory parameters. Impedance pneumography	1, 2
11	Computerized thermometer	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course's Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Introduction. Structure and composition of computerized medical complexes Seminar 1	
2		Basic parameters of physiological signals. Artifacts Seminar 2	
3		Basic principles of medical signal processing using microprocessors Seminar 3	
4		Computerized electrocardiographic complexes Seminar 4	
5		Heart rate measurement and computer signal processing Seminar 5	
6		Multichannel computerized electromyography. Electrostimulation methods Seminar 6	
7		Methods of measuring and processing brain biopotentials, computer multichannel systems. Algorithm and software of computer systems Seminar 7	
8		Computerized blood pressure measuring device. Microprocessor-controlled arterial tonometer Seminar 8	
9		Computerized electrooculography Seminar 9	
10		Hearing sensor system. Computerized impedancemetry Seminar 10	
11		Computerized audiometer Seminar 11	
12		Structure and working principle of Doppler device Seminar 12	
13		A computerized device that measures respiratory parameters. Impedance pneumography Seminar 13	

14		Computerized Thermometer Seminar 14	
15		Development prospects of computerized medical devices and systems Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Медицинские приборы. Разработка и применение (под ред. И.В. Камышко). М.: Медицинская книга, 2004, -720 с.

2. Рангайян Р.М. Анализ биомедицинских сигналов. Практический подход. М.: Физматлит, 2007, -440 с.

3. Илясов Л.В. Биомедицинская измерительная техника М.: Высшая школа, 2007, с. 342

4. Кулаичев А.П. Компьютерная электрофизиология и функциональная диагностика. М.: Форум – инфра М., 2007, -640 с.

Кореневский Н.А., Попечителев Е.П., Серегин С.П. Медицинские приборы, аппараты, системы и комплексы. Курск, ИПП-курск, 2009, -986 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	**150**
Total Workload/30(h)	**150/30**
ECTS Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Basics of Device Technology
Course Unit Code	ATMF-B12
Type of Course Unit	Elective
Level of Course Unit	4^{th} year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/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 “Fundamentals of Device Technologies” belongs to the block of general technical subjects. The subject “Fundamentals of Device Technologies” is intended for all technical specialties of the modern era. Bachelors trained in technical directions in higher education institutions will be able to study in detail the issues of improving the quality and achieving the required accuracy during the design, production technology and operation of devices by mastering the subject “Fundamentals of Device Technologies”.

Objectives of the Course:
The main goal of teaching the subject is to instill in future specialists the relevant knowledge about "Fundamentals of Device Technologies" and to create the ability to effectively use the knowledge they have acquired during the course.

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	The goal and main objective of teaching the subject is to provide future specialists with relevant knowledge about the "Fundamentals of Instrumentation Technology" 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 the operation of devices and installations, maintaining them, and improving them.	1, 2

Assessment Methods: 1. Final Exam, 2. Presentation

Course’s Contribution to Program

		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4

4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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		Introduction to the subject, main topic. Subject of the subject, basic concepts Seminar 1	
2		Production of instrument-making parts, basic processes. Characteristics of technological methods of production Seminar 2	
3		Pistachios, methods of pistachios Seminar 3	
4		Pressure treatment. Classification of pressure treatment methods for metals Seminar 4	
5		Metal forming, rolling, drawing, pressing Seminar 5	
6		Metal processing by pressure, free forging Seminar 6	

7		Metal stamping and pressure processing Seminar 7	
8		Metal scraps. Scrap metallurgy, methods of production Seminar 8	
9		Metalworking and production of metal-ceramic products Seminar 9	
10		Production of metal-ceramic products. Metal-ceramic materials Seminar 10	
11		Methods of processing nuts. Methods of processing parts using cutting tools Seminar 11	
12		Methods of processing peanuts. Processing with metal tools Seminar 12	
13		Methods of processing peanuts. Processing with abrasive tools. Seminar 13	
14		Processing methods of nuts. Electrochemical processing methods Seminar 14	
15		Methods of processing nuts. Fire processing of metals and alloys Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Abdullayev H.B., İsgəndərzadə Z.A. Yarımкeçirici çeviricilər. Baкı, Elm, 1975
2. Əsgərov T.M., Mahmudov V.A., Bayramov X.T. Eleкtron hesablama maşınları və sistemlərinin nəzəriyyəsi və layihələndirilməsi. Baкı, 1990.
3. Talibi M.Ə., Qəribov M.H., Hacıyev N.C. Mikroeleкtroniкa. Baкı, 1976.
4. Qasımzadə N.H. Metallar və başqa кonstruкsiya materialları texnologiyası. Baкı, Maarif, 1975.
5. Novruzov H.D. Кonstruкsiya materiallarının texnologiyası. Baкı, Təhsil, 2005.

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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

Course Unit Title	Biomedical Devices, Apparatus, Systems and Complexes
Course Unit Code	ATMF-B13
Type of Course Unit	Elective
Level of Course Unit	4^{th} year

National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	4
Semester when the course unit is delivered	7
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 “Biomedical devices, apparatus, systems and complexes” is one of the specialized subjects taught to students studying at the bachelor's level in the specialty “Mechatronics and robotics engineering”. The subject explains the structure, working principle and structural schemes of biomedical devices, apparatus, systems and complexes. The structure and composition of computer-based medical complexes are studied in the taught subject. In addition, the working principle of computer-based devices is analyzed and their impact characteristics are determined. In this regard, the teaching of the subject in question is relevant.

Objectives of the Course:
The purpose of the "Biomedical Devices, Apparatus, Systems and Complexes" course is to study the development prospects of computerized medical devices and systems for undergraduate students in the "Mechatronics and Robotics Engineering" specialty, to study the structure of computerized medical complexes and their working principles. The purpose of the course is to study the technology of manufacturing and objects of use of various therapeutic and diagnostic medical devices for undergraduate students in this specialty.

Learning Outcomes

	At the end of the course the student will be able to know	Assessment
1	Medical technical devices	1, 2
2	Biopotentials and their recording devices	1, 2
3	Single-channel and multi-channel electrocardiographs	1, 2
4	Galvanization and drug electrophoresis apparatus	1, 2

5	Electrostimulators	1, 2
6	Electrosurgical apparatus	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		

Course's Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. 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		Introduction. Biomedical Technical Devices Seminar 1	

2		Generalized structural scheme of biopotentials and their recorders Seminar 2	
3		Electrode, separation and input devices of biopotential recorders Seminar 3	
4		Synphasic obstacle and ways to overcome it Seminar 4	
5		Biopotential amplifiers. Biopotential amplifiers without galvanic connection Seminar 5	
6		Inkjet recording devices. Thermal recording devices Seminar 6	
7		Electrocardiography and electrocardiographs. Single-channel and multi-channel electrocardiograph. Electroencephalography and electroencephalographs. Electrogastrograph and electromyographs Seminar 7	
8		Galvanization and drug electrophoresis devices. "Potoq"-1 device Seminar 8	
9		Oral drug electrophoresis and four-chamber electrophoresis device Seminar 9	
10		Electrostimulators. Electrocardiostimulators Seminar 10	
11		Defibrillators Seminar 11	
12		Electrodiagnostics. Therapeutic devices generating low-frequency magnetic fields Seminar 12	
13		Electrostatic field therapy devices Seminar 13	
14		Inhalers. High-frequency electrotherapeutic devices Seminar 14	
15		Diathermy, darsenvalization devices. Electrosurgical devices Seminar 15	

Recommended Sources TEXTBOOK(S) 1. Н.А. Короневский, Е.П.Попечителев, С.П.Серегин, «Медицинские приборы, аппараты, системы и комплексы» Учебник. Курск ОАО «ИПП»Курск» 2009-986 стр. 2. N.T. Abdullayev, K.S. İsmayılova “Tibbi cihazlar, aparatlar, sistemlər və komplekslər” Bakı. Azərnəşr-2018. 305s. 3. Медицинские приборы. Разработка и применение. Москва.Медицинская книга 2004-720стр 4. В.Г. Гусев. «Получение информации о параметрах и характеристиках организма и физические методы воздействия на него. Учебное пособие. Москва «Машиностроение» 2004-597 стр. 5. Е.П.Попечителев, Н.А.Кореневский «Электрофизиологическая и фотометрическая медицинская техника», Учебное пособие, Москва «Высшая школа» 2002-470 стр.		
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 Credit of the Course	**5**

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

Course Unit Title	Technical Methods of Biomedical Diagnostics
Course Unit Code	ATMF-B13
Type of Course Unit	Elective
Level of Course Unit	4^{th} year
National Credits	
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	
Year of Study	4
Semester when the course unit is delivered	7
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 “Technical Methods of Biomedical Diagnostics” is one of the specialized subjects taught to students studying at the bachelor's level in the specialty “Mechatronics and Robotics Engineering”. The subject studied examines diagnostic examination methods, including technical indicators of examination methods. In addition, the analysis of diagnostic systems and their impact characteristics are determined. In this regard, the teaching of the subject in question is relevant.		
Objectives of the Course: The purpose of the subject "Technical Methods of Biomedical Diagnostics" is to study the development prospects of computerized medical devices and systems for undergraduate students in the specialty "Mechatronics and Robotics Engineering", to study the structure of computerized medical complexes and their working principles. The purpose of the subject "Technical Methods of Biomedical Diagnostics" is to study the characteristics of the impact of diagnostic examination on diagnostic systems for undergraduate students in the specialty "Mechatronics and Robotics Engineering".		
Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	General characteristics and properties of a biological object. Physical parameters characterizing a biological organism	1, 2
2	Biochemical and physical bases of the formation of electrical signals and potentials in a bioorganism	1, 2
3	Electrical activity of the heart and methods of combating noise. Technical means for measuring ECG and ECG potentials. Vectorcardiography and echocardiographic methods	1, 2
4	Generation of muscle potentials, methods of measuring them, characteristic parameters and their diagnostic significance	1, 2
5	Methods and technical means of obtaining brain electrical potentials, their analysis. Analysis of rhythms and their diagnostic significance	1, 2
6	Methods used for the diagnosis of biological objects. The essence and diagnostic indicators of photometric and spectrophotometric methods	1, 2
7	Methods for measuring electrical complex parameters. Diagnostic method of rheography or plethysmography. Pulse oximetry device	1, 2
8	Blood movement in the vessels. Measurement of pulse and blood pressure (arterial)	1, 2
9	Fluorimetric research method. Application of polyarimetric and reflectometric methods in medical research	1, 2
Assessment Methods: 1. Final Exam, 2. Presentation		
Course’s Contribution to Program		
		CL
1	ability to apply knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	4

3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	4
4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	4
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	4
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	4
8	ability to effectively interact both individually and as part of a team to achieve goals	4
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	4
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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 characteristics and properties of a biological object. Physical parameters characterizing a biological organism Seminar 1	
2		Biochemical and physical basis of the generation of electrical signals in a bioorganism. Electrophysiological indicators and their significance. Electrophysiological measurement methods Seminar 2	
3		Observing electrical potentials and signals, interference signals (artifacts), their types and repulsion Seminar 3	
4		Technical means for measuring the electrical activity of the heart and ECG potentials. Vectorcardiography and echocardiographic methods. Noise control. Application of the phonocardiography method during examination of the cardiovascular system	

		Seminar 4	
5		Generation of muscle potentials, methods of their measurement, characteristic parameters and their diagnostic significance Seminar 5	
6		Methods and technical means of obtaining brain electrical potentials, their analysis. Analysis of rhythms and their diagnostic significance Seminar 6	
7		Methods used for the diagnosis of biological objects. The essence and diagnostic indicators of photometric and spectrophotometric methods. Blood and its essence. Invasive determination of blood flow indicators (volume, velocity, total volume). Characteristics of the method and scope of application Seminar 7	
8		Methods for measuring electrical complex parameters. Pulse oximetry device and measuring channel. Blood flow in the vessels. Measurement of pulse and blood pressure (arterial) Seminar 8	
9		Fluorimetric research method. Application of polarimetric and reflectometric methods in medical research Seminar 9	
10		Information about luminescence, application of the luminescent method to determine the gas composition of air. Application and implementation of the capnometry diagnostic method Seminar 10	
11		Respiratory indicators, methods of their measurement. Pneumograph device. Recording vital capacity and ventilation indicators of the lungs. Spirometer. Temperature parameter of a biological organism. Measurement of body temperature and stages of temperature. Thermometer Seminar 11	
12		Application of electrochemical diagnostic methods. Implementation of potentiometric and conductometric methods and technical means. Coagulography method. Application of voltammetry method to determine the concentration of solutions Seminar 12	

13		Application of ultrasound signals in medical diagnostics. Exoscopy diagnostic method. Electroacoustic transducers. Production and reception of ultrasound information through piezoelectric elements. Doppler ultrasound diagnostics. Acoustic parameters of the human body. Audiometry analysis method Seminar 13	
14		Radioactivity and nuclear radiation. Application of radioactive isotopes in medicine. Biological effects of radioactive radiation. Application of X-rays in medicine. Tomography and application of tomographic examination method in medicine Seminar 14	
15		Internal magnetic field of a biological organism, methods and technical means of measuring internal magnetic field parameters. The effect of the magnetic field of the environment on the bioorganism Seminar 15	

Recommended Sources

TEXTBOOK(S)

1. Xasməmmədova G.T. Biotibbi diaqnostikanın texniki metodları. Dərs vəsaiti. Bakı, ADNA nəşriyyatı, 2014, s.286

2. Cəfərov F.İ. Normal fiziologiya. Metodik vəsait. Bakı,1981, səh. 220

3. Əliyev Ə.H., Əliyeva F.Ə., Mədətova V.M. İnsan fiziologiyası. Bakı,2008, səh. 288

4. Гусев В.Г. Получение информации о параметрах и характеристиках организма и физические методы воздействия на него. М, Машиностроение., 2004, 596 с.

5. Олейник В.П., Кулиш С.Н. Аппаратные методы исследований в биологии и медицине. Харьков, Изд-во ХАИ, 2004, ПО с.180

6. Ильсов Л.В. Биомедицинская измерительная техника. М, Высшая школа, 2007, 342-с.

7. Попечителев Е.П., Кореневский Н.А. Электрофизиологическая и фотометрическая медицинская техника. М., Высшая школа, 2002, 470 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	**150**
Total Workload/30(h)	**150/30**
ECTS Credit of the Course	**5**

Computer Engineering bachelor program

Course Unit Title	Internship
Course Unit Code	
Type of Course Unit	Compulsory
Level of Course Unit	4^{th} 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 knowledge in mechanics, electronics and informatics necessary for development and operation of complex technical systems	5
2	ability to apply knowledge in kinematics, dynamics and control systems of mechatronic devices, as well as operation of information and measuring instruments and programming	5
3	ability to generate new approaches and solutions to improve automation of processes and control of various systems	5

4	ability to effectively use both domestic and international achievements in science and technology in the design, implementation and operation of automatic and mechatronic systems	5
5	ability to diagnose, analyze and troubleshoot automatic and mechatronic systems in order to increase their reliability and sustainability	5
6	ability to analyze and develop process diagrams of robotic manipulators and mechatronic systems, as well as organize their restoration and reconfiguration	5
7	ability to control technological processes in environments where robotic and mechatronic systems are used, as well as ensure safety of work with them, implementing labor protection and environmental standards	5
8	ability to effectively interact both individually and as part of a team to achieve goals	5
9	ability to participate in continuous training and professional growth with the aim of adapting to the rapid development of technologies through participation in additional courses, career guidance initiatives and extracurricular activities	5
10	ability to use foreign language skills to obtain the necessary scientific and technical information. The 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**

Mechatronics and Robotics Engineering bachelor program, Department of “Mechanics and Mathematics”

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	Rustamova D.
Name of Lecturer (s)	Rustamova D.
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

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

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	Rustamova D.
Name of Lecturer (s)	Rustamova D.
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

Mechatronics and Robotics Engineering bachelor program, Department of "Mechanics and Mathematics"

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	Rustamova D.
Name of Lecturer (s)	Rustamova D.
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			
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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