



Azerbaijan Architecture and Construction University
Master's Center

“Confirmed by”:

Director of the Master's Center:

_____ dos. R.Y.Samedov

“14” february 2024

“Work 4.0”
Discipline
Education program
(syllabus)

Specialty(<i>code and name</i>)	02_WORK4CE / WRK4
<i>1. Information about discipline</i>	
Name of discipline	“Work 4.0”
Academic language	<i>English</i>
Academic year	<i>2024</i>
Semestr	<i>Spring</i>
Type of education	<i>Full time</i>
Educational stage	<i>Master</i>
Group	
Educational load	<i>30 hours</i>
Subject’s teaching days	<i>Tuesday</i>
Number of training weeks	<i>15</i>
Lecture-hall	<i>№401, I branch</i>
<i>2. Information about lecturer</i>	
Lecturer	<i>Ph.D. Khanlar Ganiyev</i>
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Baku – 2024

I. Course Prescription

This core course provides a comprehensive understanding of Work 4.0 within the context of Industry 4.0, covering key topics such as production system development, project management, operator empowerment, and human-centered design. Through a combination of theoretical insights, practical case studies, and hands-on activities, students will gain the knowledge and skills needed to navigate the complexities of work transformations in the digital age.

Theory and Practice! In this course, we will delve into one of the most exciting and transformative topics in today's world: Industry 4.0. Throughout the term, we will embark on a journey to understand the theoretical underpinnings, practical applications, and economic implications of this fourth industrial revolution.

Students will have the opportunity to engage in a variety of learning activities, including lectures, discussions, case studies, hands-on exercises, and real-world applications. By the end of the course, Students will have gained a comprehensive understanding of Industry 4.0 and its significance in shaping the future of industries and societies worldwide.

Industry 4.0 Essentials is a comprehensive 30-hour program designed to provide a thorough understanding of the foundational concepts, technologies, and implications of Industry 4.0.

Overall Learning Outcome:

Upon completing the "Work 4.0: Navigating Digital Transformations in Industry" course, participants will:

1. **Understand Work 4.0 Concepts:** Gain a comprehensive understanding of the concepts and principles of Work 4.0 within the context of Industry 4.0, including its impact on production systems, project management, operator roles, and human well-being.
2. **Apply Reference Architecture Model Industrie 4.0 (RAMI4.0):** Apply knowledge of RAMI4.0 to design and develop production systems that are aligned with Industry 4.0 principles, ensuring interoperability, scalability, and adaptability.
3. **Implement Adaptive Project Management Strategies:** Develop skills in adaptive project management tailored to the dynamic nature of socio-technical digital transformations in Industry 4.0, enabling effective project planning, execution, and adaptation.
4. **Empower Operators for Data-Driven Decision-Making:** Understand the Operator 4.0 concept and its role in enabling operators to make informed, data-driven decisions in complex work environments, enhancing situational awareness and operational efficiency.
5. **Design Work Systems for Ergonomics and Human Well-Being:** Apply ergonomic principles and human-centered design approaches to optimize work

- systems for Industry 4.0, promoting worker health, safety, and well-being while enhancing productivity and performance.
6. **Analyze Real-World Case Studies:** Analyze real-world case studies and best practices to contextualize theoretical concepts and gain insights into practical applications of Work 4.0 principles in various industrial settings.
 7. **Collaborate and Communicate Effectively:** Engage in collaborative learning activities, discussions, and presentations to communicate ideas, share insights, and work effectively in multidisciplinary teams, reflecting the interdisciplinary nature of Work 4.0 in Industry 4.0 contexts.

Knowledge:

During the "Work 4.0: Navigating Digital Transformations in Industry" course, students will gain a diverse range of knowledge and skills related to Work 4.0 within the context of Industry 4.0. Here's a breakdown of the knowledge students can expect to acquire:

1. **Conceptual Knowledge:**
 - Understanding of the concept and significance of Work 4.0 in the context of Industry 4.0.
 - Familiarity with the Reference Architecture Model Industrie 4.0 (RAMI4.0) and its application in designing production systems.
 - Knowledge of adaptive project management methodologies tailored to socio-technical digital transformations.
2. **Technological Knowledge:**
 - Understanding of key technologies driving Work 4.0, including data analytics, IoT, and cyber-physical systems.
 - Knowledge of tools and techniques for implementing RAMI4.0 principles in production system development.
 - Awareness of digital tools and platforms used in adaptive project management in Industry 4.0 contexts.
3. **Operational Knowledge:**
 - Insight into the role of operators in Industry 4.0 environments and the concept of Operator 4.0.
 - Knowledge of data-driven decision-making processes and methods for enhancing operator situational awareness.
 - Understanding of ergonomic principles and design considerations for optimizing work systems in Industry 4.0.
4. **Analytical Knowledge:**
 - Ability to analyze real-world case studies and best practices to understand the application of Work 4.0 principles in various industries.
 - Skills in evaluating the economic, societal, and organizational impacts of Work 4.0 implementations.
 - Ability to identify challenges and opportunities associated with Work 4.0 initiatives and propose effective solutions.

Skills:

- **Technical Skills:**

- Proficiency in using digital tools and platforms relevant to Industry 4.0, such as data analytics software, IoT devices, and project management tools.
- Ability to apply technical concepts, such as RAMI4.0 principles, in the design and development of production systems.

- **Analytical Skills:**

- Capacity to analyze complex data sets and derive actionable insights to inform decision-making processes.
- Ability to evaluate the effectiveness of Work 4.0 solutions and strategies based on quantitative and qualitative metrics.

- **Problem-Solving Skills:**

- Capability to identify and address challenges associated with Work 4.0 initiatives, such as interoperability issues, workforce adaptation, and ergonomic considerations.
- Skills in developing innovative solutions to optimize work processes and enhance operational efficiency in Industry 4.0 environments.

- **Adaptability and Flexibility:**

- Ability to adapt to evolving technological landscapes and dynamic project requirements inherent in socio-technical digital transformations.
- Capacity to adjust project plans and strategies in response to changing priorities, resource constraints, and stakeholder needs.

- **Communication and Collaboration Skills:**

- Effective communication skills to articulate ideas, insights, and recommendations to diverse audiences, including technical and non-technical stakeholders.
- Collaboration skills to work effectively in multidisciplinary teams, leveraging diverse perspectives and expertise to achieve common goals.

- **Critical Thinking and Decision-Making Skills:**

- Capacity to critically evaluate the potential impacts and implications of Work 4.0 solutions on organizational performance, worker well-being, and societal outcomes.
- Ability to make informed decisions based on thorough analysis, ethical considerations, and strategic priorities.

- **Project Management Skills:**

- Skills in planning, organizing, and executing projects in the context of socio-technical digital transformations, including resource allocation, risk management, and stakeholder engagement.
- Ability to apply adaptive project management methodologies to navigate uncertainties and complexities inherent in Industry 4.0 initiatives.

General competencies:

- **Critical Thinking:** Developing the ability to analyze, evaluate, and synthesize information critically, enabling informed decision-making and problem-solving.
- **Creativity and Innovation:** Fostering a mindset of creativity and innovation to generate novel ideas, approaches, and solutions to complex challenges in Work 4.0 environments.
- **Adaptability:** Cultivating adaptability and resilience to thrive in dynamic and rapidly changing work environments, including the ability to embrace new technologies and methodologies.
- **Communication Skills:** Enhancing communication skills, including written, verbal, and interpersonal communication, to effectively convey ideas, collaborate with others, and build relationships.
- **Collaboration:** Developing the ability to work collaboratively with diverse teams and stakeholders, leveraging different perspectives and expertise to achieve shared goals.
- **Ethical Awareness:** Fostering ethical awareness and integrity in decision-making and professional conduct, considering the social, environmental, and ethical implications of Work 4.0 initiatives.
- **Leadership:** Cultivating leadership qualities, including the ability to inspire and motivate others, facilitate teamwork, and drive positive change in Work 4.0 contexts.
- **Problem-Solving:** Enhancing problem-solving skills to identify, analyze, and address complex challenges effectively, employing a systematic and evidence-based approach.
- **Self-Management:** Developing self-management skills, including time management, organization, and self-motivation, to effectively balance competing priorities and responsibilities.
- **Lifelong Learning:** Cultivating a commitment to lifelong learning and professional development, including the ability to adapt to emerging trends and technologies in Work 4.0 and beyond.

III. Plan of lectures, subject matter and training schedule

Nº	Date	The topic of lecture and code of literature	Auditorium Hours
1	2	3	4

1	20.02.2024 27.02.2024	<p>Topic 1: Re-imaging Work in the Context of Industry 4.0.</p> <p><i>Re-imaging work systems with the ongoing Industry 4.0 digital transformation in the value adding production and logistic processes innovative development</i></p> <p>Outline:</p> <ol style="list-style-type: none"> 1. Building on the concept of Work 4.0. 2. Digital technological developments fusion 3. Work is proving to be a key locus of the digital transformation. 4. Work 4.0 production system development based on Reference Architecture Model (RAMI) for Industry 4.0 	4
2	05.03.2024 12.03.2024	<p>Topic 2: Cyber Physical Production Systems in transition to the Industry 4.0 regarding work digital transformation</p> <p>Outline:</p> <ol style="list-style-type: none"> 1. Foundation and distributive nature of CPS 2. Importance and attributes of CPPS in transition to the Industry 4.0 3. Major roles and important areas of CPPS application in I4.0 concept 4. Reference architectures for CPS-based I4.0 systems 5. Cyber-Physical Systems and Production Organization 6. Work system model to categorizing I4.0 transition challenges 7. Changes of production work system on the way to the Work 4.0 	4
3	19.03.2024 26.03.2024	<p>Topic 3: Work 4.0 production system development based on Reference Architecture Model Industrie 4.0 (RAMI4.0)</p> <p>Outline:</p> <ol style="list-style-type: none"> 1. Introduction and Understanding RAMI4.0. 2. Application of RAMI4.0 in Production System Development 3. Key Features of Work 4.0 Production Systems 4. Benefits and Advantages of RAMI4.0-based Production Systems 5. Case Studies and Best Practices 6. Challenges and Considerations 7. Future Trends and Opportunities 8. Conclusion and Discussion 	4
4	02.04.2024 09.04.2024	<p>Topic 4: Adaptive project management for the context of socio-technical digital transformation</p> <p>Outline:</p> <ol style="list-style-type: none"> 1. Introduction to Socio-Technical Digital Transformation. 2. Fundamentals of Adaptive Project Management. 3. Challenges in Socio-Technical Digital Transformation Projects. 4. Adaptive Project Management Frameworks 5. Strategies for Adaptive Project Management 6. Case Studies and Best Practices 7. Tools and Techniques for Adaptive Project Management 8. Future Directions and Challenges 9. Conclusion and Discussion 	4

5	16.04.2024 23.04.2024 30.04.2024	Topic 5: Operator 4.0 concept of the complex activities conducting data-driven decision-making processes and work situational awareness Outline: 1. Introduction and Understanding Complex Activities in Operator 4.0 2. Data-Driven Decision-Making for Operators 3. Enhancing Work Situational Awareness 4. Human-Machine Collaboration in Operator 4.0 5. Case Studies and Best Practices 6. Challenges and Considerations 7. Future Trends and Opportunities 8. Conclusion and Discussion	6
6	07.05.2024 14.05.2024	Topic 6: Work 4.0 ergonomics and human's well-being designing towards industry 4.0 Outline: 1. Introduction to Ergonomics in the Context of Industry 4.0 2. Understanding Human Factors in Work 4.0. 3. Principles of Work 4.0 Ergonomics Design 4. Technologies for Enhancing Ergonomics in Industry 4.0 5. Promoting Human Well-Being in Industry 4.0 6. Case Studies and Best Practices 7. Challenges and Considerations 8. Future Trends and Opportunities 9. Conclusion and Discussion	4
7	21.05.2024 28.05.2024	Topic 7: Integrating Industry 4.0: Transforming Work Systems for the Future Outline: 1. Introduction to Industry 4.0 and Work Transformation 2. Key Concepts and Foundations: Work 4.0 and Cyber Physical Production Systems (CPPS) 3. Utilizing Reference Architecture Models: RAMI4.0 and Its Application in Work System Development 4. Adaptive Project Management in Socio-Technical Digital Transformation 5. Operator 4.0: Data-Driven Decision Making and Human-Machine Collaboration 6. Ergonomics and Human Well-Being in Work 4.0 Design 7. IoT Integration for Healthy and Safe Work Environments 8. • Conclusion: Bridging All Topics for Holistic Work System Evolution	4
		Total	30

IV. Coursework and their features

There is no coursework in the subject program.

V. Free work

Topics for free work of students.

In the learning process, students' knowledge of the subject is assessed by oral or written answers to theoretical questions posed by the subject teacher during lectures and lessons, as well as an oral examination on the ability to apply the knowledge in practical issues. Tests and discussions are organized by the teacher of the subject in order to check the quality of assimilation. The topics of free work performed by students are given by the teacher who teaches the subject, and may include the following topics:

1. "Industry 4.0 Adoption Strategies: A Case Study Analysis"
2. "Human-Centered Design Principles in Industry 4.0: Enhancing User Experience in Digital Work Environments"
3. "Agile Project Management in Industry 4.0: Adapting to Rapid Technological Changes"
4. "The Role of Robotics and Automation in Workforce Transformation in Industry 4.0"
5. "Digital Twin Technology: Revolutionizing Work Processes in Industry 4.0"
6. "Cybersecurity Challenges in Industry 4.0: Safeguarding Work Systems from Cyber Threats"
7. "Blockchain Applications in Supply Chain Management: Enhancing Transparency and Efficiency in Industry 4.0"
8. "Upskilling and Reskilling the Workforce for Industry 4.0: Strategies for Success"
9. "Environmental Sustainability in Industry 4.0: Balancing Technological Advancements with Eco-Friendly Practices"
10. "The Future of Work: Predicting Trends and Challenges Beyond Industry 4.0"

VI. assessment

Student's final score is calculated by the maximum 100 points. Of these, the student earns 50 points during the semester and 50 points in the exam.

50 points scored during the semester include:

- for the duration of the course - 10 points;
- free works - 10 points;
- According to the results of classes - 30 points.

50 points scored before the exam in the semester include:

- for the attendance of the course - 10 points;
- according to the results of seminars - 30 points;
- for free works (1 point for one free work) - 10 points;

The number of points scored by the student in the exam must be at least 17.

Student knowledge is evaluated in accordance with the European credit transfer system (ECTS) in accordance with the following table:

91 – 100 points	A	Excellent
81 – 90 points	B	Very good
71 – 80 points	C	Good
61 – 70 points	D	Enough
51 – 60 points	E	Satisfactory
Less than 51	F	Insufficient

Violation of the rules of conduct. The student must be attentive and active in the educational process, must observe hygiene and should be engaged only in the training of the course. It is necessary to observe ethical standards accepted in society and legal norms existing in our country. If a student violates the rules of disciplinary action, he / she will be punished in the manner prescribed by the University Regulation.

VII. Teaching materials

7.1. Recommended literature

1. "Industry 4.0: The Industrial Internet of Things" by Alasdair Gilchrist - Provides a comprehensive overview of Industry 4.0 concepts, technologies, and implications for work transformations.
2. "The Fourth Industrial Revolution" by Klaus Schwab - Offers insights into the societal and economic impacts of Industry 4.0 and the transformations it brings to various sectors, including work.
3. "Adaptive Project Management: Leading Complex and Uncertain Projects" by Frederick W. Gluck, Stephen P. Flynn, and Jerry L. Manas - Focuses on adaptive project management strategies essential for managing projects in the dynamic environment of Industry 4.0.
4. "Human Factors in Simple and Complex Systems" by Robert W. Proctor and Trisha Van Zandt - Explores the role of human factors and ergonomics in designing work systems for Industry 4.0, emphasizing user-centered design principles.
5. "The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses" by Eric Ries - Offers insights into lean startup methodologies applicable to Industry 4.0 contexts, emphasizing agility and innovation.
6. "Digital Transformation: Survive and Thrive in an Era of Mass Extinction" by Thomas M. Siebel - Discusses digital transformation strategies and technologies shaping Industry 4.0, including IoT, AI, and blockchain.
7. "The Art of Project Management" by Scott Berkun - Provides practical guidance on project management principles and practices, relevant for navigating work transformations in Industry 4.0.
8. "Industry 4.0: Managing The Digital Transformation" by Alp Ustundag and Emre Cevikcan - Offers insights into managing digital transformation initiatives in the context of Industry 4.0, including production system development and smart manufacturing.
9. "Smart Manufacturing: Applications and Case Studies" edited by Dileep R. Sule - Presents case studies and applications of smart manufacturing technologies and practices relevant to Industry 4.0.
10. "Work 4.0: Understanding and Leveraging Industry 4.0 Technologies" by Christoph Roser - Explores the concept of Work 4.0 and its implications for workforce management, skill development, and organizational design in the era of Industry 4.0.

VIII. It is planned to conduct written exam on the subject

Note: 1. Exams correspond to the curriculum of the subject (syllabus);

2. The number and content of exams can be changed by the subject teacher before the exam in accordance with the curriculum of the subject.

IX. Training plan of discipline

In the academic calendar, the course schedule is organized in accordance with the academic schedule of the university.

X. Studying students' views on the subject (comments and suggestions)

This employee training plan (syllabus) is in accordance with the State Standard for the Master's level Education Program of Azerbaijan Republic.

This employee training plan (syllabus) for the subject was discussed and approved at the meeting of the "Master's Center" on February 2024, protocol №_____.

Date of meeting "15" February 2024

_____ Senior Lecturer, Ph.D. in economics / MSc, Khanlar Ganiyev