Federal State Autonomous Educational Institution of Higher Education "Moscow Institute of Physics and Technology (National Research University)"

APPROVED
Vice Rector for Academic Affairs

A.A. Voronov

Work program of the course (training module)

course: Digital Transformation: Social and Economic Challenges/Цифровая трансформация: социальные и экономические вызовы
major: Applied Mathematics and Physics
specialization: Beam-Plasma Systems and Technologies/Пучково-плазменные системы и технологии
Phystech School of Aerospace Technology
Educational and scientific center for the humanities and social sciences
term: 1
qualification: Master

Semester, form of interim assessment: 2 (spring) - Exam

Academic hours: 30 AH in total, including:
lectures: 30 AH.
seminars: 0 AH.
laboratory practical: 0 AH.

Independent work: 75 AH.

Exam preparation: 30 AH.

In total: 135 AH, credits in total: 3

Number of course papers, tasks: 2

Author of the program: A.V. Eliseev, candidate of economic sciences

The program was discussed at the Educational and scientific center for the humanities and social sciences 26.08.2022

Annotation

This elective course is designed for first-year students of master's programs to make you forget about physics for a while, have some rest. And the best rest for a brain is to make it think of something else. On this course you will see that besides nature that you explore, there is society that we all live. It will allow you to understand that what you do in natural sciences creates an area for research for us, social scientists, how to live with all that you created.

"May you live in interesting times" as the English saying usually connected to Chinese curse goes.

I have bad news for you. We do live in extremely interesting times. What we witness today is the greatest since Industrial revolution transformation which leads not only to changes of our economy but also changes in our everyday life. All of the permanent crisis and wars that we observe nowadays are just inevitable consequences.

On this course we will try to understand what digital transformation is, how it undergoes, what the mechanism of transition is, how our society changes to adjust to this new reality, and most important how we should react to adapt to this great transformation.

If you want to know what we might do to succeed in this new ever changing reality, this course is exactly for you.

1. Study objective

Purpose of the course

To familiarize students with contemporary processes of digital transformation, what consequences they might have and challenges they will lead to, to provide students theoretical tools for understanding these processes, and optimally reacting to challenges they arise.

Tasks of the course

- To provide an overview of theoretical approaches to economic transformation;
- to work out framework for transition analysis;
- to introduce students into main social and economic challenges caused by digital transformation and what dramatic consequences they might lead to;
- to familiarize students with possible economic outcomes and to show what economic policy should be to overcome all problems, avoid disastrous scenarios and get use of all the bounties digital transformation can bring.

2. List of the planned results of the course (training module), correlated with the planned results of the mastering the educational program

Mastering the discipline is aimed at the formation of the following competencies:

Code and the name of the competence	Competency indicators
UC-1 Use a systematic approach to critically analyze a problem,and develop an action plan	UC-1.1 Systematically analyze the problem situation, identify its components and the relations between them
	UC-1.2 Search for solutions by using available sources
	UC-1.3 Develop a step-by-step strategy for achieving a goal, foresee the result of each step, evaluate the overall impact on the planned activity and its participants
UC-5.1 Analyze and consider cultural diversity in intercultural interactions	UC-5.1 Identify specific philosophical and scientific traditions in major world cultures
	UC-5.2 Define the theoretical and practical significance of cultural and linguistic factors within various interrelated philosophical and scientific traditions
UC-6 Determine priorities and ways to improve performance through self-assessment	UC-6.1 Achieve personal growth and professional development, determine priorities and ways to improve performance
	UC-6.2 Evaluate performance results in correlation with the set objectives and applied methods

3. List of the planned results of the course (training module)

As a result of studying the course the student should:

know:

- Core approaches to economic transformation;
- criteria used to determine stages of economic development;
- key problems of traditional economic methodology being applied to digital economy analysis.

be able to:

- Analyze social and economic phenomena caused by digital transformation;
- analyze transitional dynamics and predict possible economic outcomes for world economy, national economy, and the student himself/herself;
- determine main social and economic challenges digital transformation arises;
- provide policy options for a changing world.

master:

- Tools for economic transition analysis;
- tools of critical economic thinking.

4. Content of the course (training module), structured by topics (sections), indicating the number of allocated academic hours and types of training sessions

4.1. The sections of the course (training module) and the complexity of the types of training sessions

№	Topic (section) of the course	Types of training sessions, including independent work			
		Lectures	Seminars	Laboratory practical	Independent work
1	Economic Transformation: Literature Survey	6			15
2	Economic Methodology: Are Our Tools Good Enough?	2			5
3	Digital Economy: Challenges We Face	16			40
4	Economic Policy in New World	6			15
AH in total		30			75
Exam preparation		30 AH.			
Total complexity		135 AH., credits in total 3			

4.2. Content of the course (training module), structured by topics (sections)

Semester: 2 (Spring)

1. Economic Transformation: Literature Survey

Various criteria of stage determination and approaches to transformation. Critique of postindustrialism. Resource scarcity and economic transformation. Vital resources and stages of development. Transitional dynamics and transformational crises. Digital economy and economics dead-end.

2. Economic Methodology: Are Our Tools Good Enough?

Resource scarcity and science without subject. Methods that we use and why they do not work anymore. Economic transformation: basic methodology.

3. Digital Economy: Challenges We Face

Resource scarcity, heterogeneity and foodchain structure of world economy. Great capital vs. labor (knowledge) battle. Monopolization and inequality. Global capital model failure. World without jobs. Challenges for science: areas of research.

4. Economic Policy in New World

Economic Policy Analysis: Are Our Tools Good Enough? Three Possible Outcomes: Capitalist (Disastrous), Revolutionary (Utopian), Regulatory (Second Best). New Challenges – New Policy. Economic Policy Mechanism

5. Description of the material and technical facilities that are necessary for the implementation of the educational process of the course (training module)

The implementation of academic course requires an audience of appropriate capacity. While lecturing, a marker or slate, tables, charts are used. Technical training tools include computer with internet access and licensed software, multimedia projector.

6. List of the main and additional literature, that is necessary for the course (training module) mastering

Main literature

1. Цифровая трансформация экономики России: проблемы, перспективы, практики. В 2 ч. Ч. 1, учебное пособие / Е. В. Анохова, Д. А. Горский, О. В. Дивненко%gМинистерство науки и образования Российской Федерации, Московский физико-технический институт (национальный исследовательский университет), Москва, МФТИ, 2020

Additional literature

7. List of web resources that are necessary for the course (training module) mastering

http://piketty.pse.ens.fr/en/capital21c2
www.worldbank.org
www.ilo.org
www.nber.org

8. List of information technologies used for implementation of the educational process, including a list of software and information reference systems (if necessary)

Multimedia technology is used in lecture classes, including the demonstration of presentations.

9. Guidelines for students to master the course

While studying the student must independently replenish his knowledge and study the fundamental publications in subject area. Successful mastering of the course requires hard work of the student directly on lecture, and also independent work for assimilation of the passed material and the solution of the set of theoretical problems.

SUPPLEMENT

Assessment funds for course (training module)

major:	Applied Mathematics and Physics
specialization:	Beam-Plasma Systems and Technologies/Пучково-плазменные системы и технологии Phystech School of Aerospace Technology Educational and scientific center for the humanities and social sciences
term:	1
qualification:	Master

Semester, form of interim assessment: 2 (spring) - Exam

Author: A.V. Eliseev, candidate of economic sciences

1. Competencies formed during the process of studying the course

Code and the name of the competence	Competency indicators
UC-1 Use a systematic approach to critically analyze a problem,and develop an action plan	UC-1.1 Systematically analyze the problem situation, identify its components and the relations between them
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	UC-1.3 Develop a step-by-step strategy for achieving a goal, foresee the result of each step, evaluate the overall impact on the planned activity and its participants
UC-5.1 Analyze and consider cultural diversity in intercultural interactions	UC-5.1 Identify specific philosophical and scientific traditions in major world cultures
	UC-5.2 Define the theoretical and practical significance of cultural and linguistic factors within various interrelated philosophical and scientific traditions
UC-6 Determine priorities and ways to improve performance through self-assessment	UC-6.1 Achieve personal growth and professional development, determine priorities and ways to improve performance
	UC-6.2 Evaluate performance results in correlation with the set objectives and applied methods

2. Competency assessment indicators

As a result of studying the course the student should:

know:

- Core approaches to economic transformation;
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- key problems of traditional economic methodology being applied to digital economy analysis.

be able to:

- Analyze social and economic phenomena caused by digital transformation;
- analyze transitional dynamics and predict possible economic outcomes for world economy, national economy, and the student himself/herself;
- determine main social and economic challenges digital transformation arises;
- provide policy options for a changing world.

master:

- Tools for economic transition analysis;
- tools of critical economic thinking.

3. List of typical control tasks used to evaluate knowledge and skills

Not provided.

4. Evaluation criteria

The control on the course is based on a written essay performed at home. The essay should demonstrate student's ability to reflect on particular issue related to the course and should develop argument using some academic readings.

The topics of the essay may include (but are not limited to) the following problems.

1. Critical analysis of a particular approach to economic transformation.
2. Postindustrialism concept and its critique.
3. Resource scarcity: Is there any?
4. Digital economy: Trends and consequences.
5. Do economic theory methods still work in digital economy?
6. Digital economy and new economic structure of the world.
7. Digital economy and inequality.
8. Digital economy and monopolization.
9. Can digital economy lead to global capital model failure?
10. Digital economy: World without jobs?
11. Digital economy: How to survive in the world of digits?
12. Digital economy and economic policy.

An essay should be at least 10 pages long (Times, 12). An essay should have a standard IMRAD (Introduction, Methods, Results, and Discussion) structure:

1. Introduction: Problem or argument which student would like to develop.
2. Methods: Theory survey (brief discussion of theoretical approaches and a framework student will use to develop his / her argument).
3. Results: Research part in which student develops his argument giving proofs and examples.
4. Discussion in which student gives his concluding remarks.

An essay should be submitted electronically till June, 4.

Assessment “Excellent” (8-10): Has a clear argument, which addresses the topic and responds effectively to all aspects of the task. Fully satisfies all the requirements of the task; rare minor errors occur;

Assessment “Good” (5-7): Responds to most aspects of the topic with a clear, explicit argument. Covers the requirements of the task; may produce occasional errors.

Assessment “Satisfactory” (3-4): Generally addresses the task; the format may be inappropriate in places; display little evidence of (depending on the assignment): independent thought and critical judgment include a partial superficial coverage of the key issues, lack critical analysis, may make frequent errors.

Assessment “Fail” (0-2): Fails to demonstrate any appropriate knowledge on the topic discussed.

5. Methodological materials defining the procedures for the assessment of knowledge, skills, abilities and/or experience

Exam grade is granted on the basis of student’s essay and discussion on the problem of an essay.