

National Research University Higher School of Economics

“The History of Technological Development in Society”

(3 ECTS)

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No. of credits	3
Contact hours	32
Independent study (hours)	82
Year of study, degree programme	Master's programme 1 st year, 3 module, elective course
Study format	Interactive lecturing

1. Course Description

The course consists of one module and is designed for master students of the National Research University Higher School of Economics (HSE). The course length is **114** academic hours in total of which **32** hours are class room hours for lectures and **82** hours are devoted to self study.

a. Pre-requisites

- Interest in technological development and innovation processes
- Creative thinking

b. Abstract:

Humans interact with each other and their environment through technology - that is the use of materials, energy, tools, and complex machines. Technology has been designed and created to serve human needs and desires. On the other hand, technology has itself shaped human co-existence and societies and became a defining feature of human existence. This course studies the bidirectional nature of this relationship through discussing technology as the outcome of particular technical, historical, cultural, and political efforts and the societal consequences triggered through technological change. Also, the analysis will include how political, military, economic, social, and religious objectives have guided the design and use of technology.

2. Learning objectives:

The course studies how technological and societal development have influenced and nourished each other. The lectures cover episodes of mechanization, communications, electronics, computers, power & energy, or military technology. The course builds on historical examples of technological development and societal change and comments and reflects on the two latest major publications on the subject, namely

Yuval Noah Harari (2018), *21 Lessons for the 21st Century*, Spiegel & Grau, ISBN 9780525512172.

Steven Pinker (2018), *Enlightenment now*, Viking, ISBN 9780525427575.

3. Learning outcomes

Students will be familiarized with concepts of “technological lock-in”, path-dependencies, serendipity-effects and unintended consequences of new technologies. Also, we will discuss ethical and moral issues associated with technological choices.

4. Examples of Assessment Materials

- War has been seen as an impetus for technological development. From the early Greek armies onwards, engineering talent was vital for holding up enemy advances or overcoming enemy defences. Name some military-related innovations that shaped civil society.
- The industrial revolution was made possible through a series of technological developments in various fields. Name some of them and how they influenced economic growth.
- The rise of universities in the 12th century is closely connected with knowledge transfer from the East. Explain how this knowledge transfer took place, and which knowledge was brought to Europe in these times.

5. Course Plan

Module	Topic (course section)	Total hrs	Expected learning outcomes (ELO) to be assessed	Assessment formats
		LC		

		SM onl/sw		
Early technologies	Topic 1. From the emergence of Homo Sapiens to the Middle ages	4	Understanding the interplay of civil and military technologies	Written exam at the end of the course
		11		
		4		
	Topic 2. Technology and war: from ancient warfare to the Renaissance engineers	11		
		4		
		11		
The age of discovery and scientific revolution	Topic 3. The telescope, the heliocentric worldview, the printing press and the measurement of time	4	Understanding how the emerging technologies changed the view of the human and the natural, naming and dating some of the most important technological developments	Written exam at the end of the course
		10		
		4		
	Topic 4. The laws of motion, universal gravitation, and electricity.	10		
		4		
		10		
The 20 th century	Topic 5. The industrial revolution: The mechanization of the production process and the rise of the factory.	4	Naming some of the key innovations and understanding the far-reaching social changes introduced by the industrial revolution	Written exam at the end of the course
		10		
		4		
	Topic 6. The history of space exploration: Sputnik, the Apollo missions, the space race and new horizons.	10		
		4		
		10		

			technological breakthroughs	
	Topic 7. The history of car design: The Benz Motorcar, muscle and silhouette cars, and the most successful series of mass-produced cars.	4 10	Understanding the role of design and technology in consumer culture	Written exam at the end of the course
	Topic 8. The history of electronic games: From arcade games to youth culture, Massive Online Games and Virtual Reality.	4 10	Understanding the role of niche markets in driving technological development	Written exam at the end of the course
	Hours for types of classes:	32		
		82		
	Total hours	114		

Lecture 1. Early technologies

Topic outline:

- The lecture discusses the emergence of the modern man (*homo sapiens*) and studies early technologies like hand axes or forms of artistic expressions like cave art. Then, we discuss selected technologies that shaped the early empires up to the middle ages.

Main references/books/reading:

Kelly K (2010): What technology wants, Viking.

Basalla G. (2010): The Evolution of Technology, Cambridge Studies in the History of Science.

Lecture 2. Technology and War

Topic outline:

- The history of War is shaped by the application of technology at the battlefields. We discuss the development from the beginning of mankind to the 16th century.

Main references/books/reading:

Roland A. (2016): War and Technology, a very short introduction, Oxford.

Lecture 3. The age of discovery

Topic outline:

- Renaissance geniuses like Leonardo da Vinci or Galileo Galilei and the introduction of technologies like printing or the clock tower.

Main references/books/reading:

Sawday J (2000): The Renaissance Computer: Knowledge Technology in the First Age of Print, Taylor and Francis.

Lecture 4. Scientific Revolution and Enlightenment

Topic outline:

- Isaac Newton and the discovery of electricity.

Main references/books/reading:

Bodenis D. (2005): Electric Universe: How Electricity Switched on the Modern World, Three Rivers Press.

Lecture 5. The industrial revolution

Topic outline:

- The rise of the factory, the mechanization of the production process, and the emergence of the steam engine

Main references/books/reading:

Hobsbawm E. (1999): Industry and Empire: The Birth of the Industrial Revolution, The New Press.

Lecture 6. The history of space exploration

Topic outline:

From the first satellites, the first man in space, on the moon and the international space station.

- Erickson L.K. (2010) Space Flight: History, Technology, and Operations, The Scarecrow Press.
- Siddiqi A.A. (2000), Sputnik and the Soviet Space Challenge, University Press of Florida.

Lecture 7. The history of car design

Topic outline:

From the Benz Motocar (1885) to the cars of pre and post WWII and the muscle cars, the silhouette cars - and the vision of the flying car.

Main references/books/reading:

Provided by the author

Lecture 8. The history of electronic games

Topic outline:

From arcade games to youth culture, Massive Online Games and Virtual Reality

Main references/books/reading:

Provided by the author

6. Examination Type and Grading System

The total grade will be grade of the final exam

In case of retake, a new exam will be prepared

Final control (F): individual oral examination

Summary Table: grading scale

Ten-point scale [10]
1 – unsatisfactory
2 – very bad
3 – bad
4 – satisfactory
5 – quite satisfactory
6 – good
7 – very good
8 – nearly excellent
9 – excellent
10 – brilliant

7. Organization of Studies for Persons with Limited Mobility and Disabilities

If necessary, learners with limited mobility or a disability (as per his/her application), as well as per his/her individual rehabilitation programme, may be offered the following options for receiving learning information with due consideration of his/her individual psycho-physical needs (e.g., via eLearning studies or distance technologies):

- for persons with impaired vision: enhanced fonts in hard copy documents; e-documents; audio files (transfer of study materials to an audio-format); hard copy documents with the use of Braille; individual consultation with a facilitated communicator; individual assignments and mentoring;
- for persons with hearing impairments: in hard copy; e-documents; video materials with subtitles; individual consultation with a facilitated communicator; individual assignments and mentoring;
- for persons with a muscular-skeleton disorder: in hard copy; e-documents; audio-files, individual assignments and mentoring.

8. Methods of Instruction

Lecture

9. Software Support, including Open-Source Database Software

- HSE Library E-resources
- Microsoft Windows 7 Professional RUS: internal university network (agreement)
- Microsoft Windows 10: internal university network (agreement)
- Microsoft Windows 8.1 Professional RUS: internal university network (agreement)
- Microsoft Office Professional Plus 2010: internal university network (agreement)

10. Special Equipment

Classrooms for lectures provide proper use and presentations of particular topics, specifically:

- PC with internet access and office software or laptop
- multimedia projector
- screen
- flipchart