Національний технічний університет України
«КИЇВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ
імені ІГОРЯ СІКОРСЬКОГО»

Department of Machines and Apparatus for Chemical and Oil Refining

THEORY OF KNOWLEDGE AND METHODS OF INFORMATION PROCESSING

Work program of the discipline (Syllabus)

Details of the discipline	
Level of higher education	***Third (educational and scientific)***
Branch of knowledge	*13 Mechanical engineering*
Specialty	*133 Industrial engineering*
Educational program	*Industry engineering*
Discipline status	*Selective*
Form of study	*eye (day)*
Year of preparation, semester	*2nd year, spring semester*
The scope of discipline	*5*
Semester control / control measures	*Test*
Timetable	
Language of instruction	*Ukrainian*
Information about course leader / teachers	Lecturer:*Ph.D., Gulienko Sergey Valerievich, sergiiguliienko@gmail.com, +38504488173* Practical / Seminar: *Ph.D., Gulienko Sergey Valerievich, sergiiguliienko@gmail.com, +38504488173* Laboratory:
Course placement	

Curriculum of the discipline

1. Description of the discipline, its purpose, subject of study and learning outcomes

Cognition - the process of purposeful, active reflection of reality in the human mind, due to socio - historical practice of mankind.

Theory of cognition - a doctrine that studies the nature of cognition, the laws of human cognitive activity, its cognitive capabilities and abilities; preconditions, means and forms of cognition, as well as the relation of knowledge to reality, the laws of its functioning and the conditions and criteria of its truth and authenticity.

The main thing in the theory of cognition is the question of the relation of knowledge about the world to the world itself, whether our consciousness (thinking, feeling, imagination) is able to give an adequate reflection of reality.

Scientific knowledge is a study characterized by its special goals and objectives, methods of obtaining and testing new knowledge. It is designed to pave the way for practice, to provide theoretical foundations for solving practical problems. The driving force of cognition is practice, it gives science factual material that requires theoretical understanding and justification, which creates a reliable basis for understanding the essence of the phenomena of objective reality. The path of cognition is determined from living

contemplation to abstract thinking and from the latter to practice. This is the main function of scientific activity.

An important element of the process of scientific knowledge is scientific information.

Scientific information is logical information that is obtained in the process of cognition, adequately reflects the laws of the objective world and is used in socio-historical practice. The main features of scientific information:

- it is obtained in the process of cognition of the laws of objective reality, the basis of which is practice, and is presented in the appropriate form;

- is documented or publicly announced information about domestic and foreign achievements of science, technology, production, obtained in the process of research, development, production and public activities.

In modern conditions, in addition to traditional sources of information, an important source of scientific information are resources on the Internet. Modern search engines allow you to quickly find the information you need, but along with useful information is a large amount of advertising and information from unreliable sources. To simplify scientific information, specialized databases and abstract resources have been created, which should be considered in more detail.

This discipline acquaints and illustrates the main provisions of the theory of knowledge, sources of scientific information and methods of their processing.

The subject of the discipline "Theory of cognition and methods of information processing" - the principles and laws of thermodynamics and their application in chemical engineering.

The purpose of the discipline "Theory of cognition and methods of information processing":

The purpose of studying this discipline is to form in students a set of knowledge, namely:

- *systematic approach to the analysis of information, information field, working environment;*
- *modern methods of analysis and software products for modeling the information field and factors of influence;*
- *algorithmization of calculations and design of analysis methods;*

In accordance with the purpose of preparing a bachelor's degree in this specialty requires strengthening the competencies formed by students:

- *ability to analyze and operate with a given amount of information;*
- *to make programs of the analysis of a condition of the modern working environment;*
- *to determine on the basis of the received indicators possible directions of improvement of the equipment and technological lines;*
- *to determine the technological parameters of technological processes according to the created computer models and to forecast the technical and economic indicator of production.*

2. Prerequisites and postrequisites of the discipline (place in the structural and logical scheme of education according to the relevant educational program)

Discipline "Theory of cognition and methods of information processing" is an elective discipline.

Requirements for the beginning of the study include basic knowledge obtained during the first year of training, in particular knowledge of the disciplines: "Philosophical principles of scientific activity", "Methodology of scientific research".

The study of the discipline will be useful in conducting research and preparing sections of the dissertation.

3. The content of the discipline

Section 1. Theory of cognition.

Topic 1.1 Sources of knowledge.

Sensory experience and rational thinking. Sensualism and rationalism. Possibilities and limits of cognition.

Topic 1.2 The essence of the process of cognition.

Approaches to cognition. Cognition as a reflection of reality. Subject and object of cognition. Concepts of truth.

Section 2. Scientific information

Topic 2.1 Traditional sources of scientific information.

Scientific document. Primary information. Secondary information.

Topic 2.2. Modern sources of scientific information

The main and most authoritative sources of scientific information.

Section 3. Methods of information processing.

Methods of statistical data analysis.

4. Training materials and resources

Basic literature:

1. *Scientific work on the topic of master's dissertation - 1. Fundamentals of scientific research. Konspekt lektsii kreditnoho modulya [Electronic resource]: a textbook for students majoring in 133 "Industrial Engineering", specialization "Engineering, computer modeling and design of equipment for chemical and oil refining" / KPI. And Sikorsky's grief; compiled by: SV Guliyenko., SS Gaidai - Electronic text data (1 file: 4.52 MB). - Kyiv: KPI named after Igor Sikorsky, 2019. - 128 p. - Name from the screen.*
2. *Modeling of membrane separation processes [Electronic resource]: a textbook for students majoring in 133 "Industrial Engineering", specialization "Engineering, computer modeling and design of equipment for chemical and oil refining" / KPI. Igor Sikorsky; structure. SV Gulienko. - Electronic text data (1 file: 3.25 MB). - Kyiv: KPI named after Igor Sikorsky, 2017. - 166 p. - Name from the screen.*
3. *Semenyuk Eduard. Philosophy of modern science and technology: a textbook / Eduard Semenyuk, Vladimir Melnik. - View. 3rd, ed. and add. - Lviv: Ivan Franko Lviv National University, 2017. - 364 p*
4. *Guide to applied scientometrics: textbook. way. / Ridey NM, Zazymko OV, Klich LV, Kishchak TS. - Kherson: Oldi-plus, 2020. - 344 p.*

Additional literature:

1.
2. *https://www.sciencedirect.com/*
3. *https://www.springer.com/gp*
4. *www.scopus.com*
5. *https://clarivate.com/products/web-of-science/*
6. *www.scholar.google.com.ua*
7. *www.doaj.org*

8. www.narcis.nl
9. https://royalsociety.org
10. http://www.nbuv.gov.ua
11. https://www.crossref.org/
12. https://www.researchgate.net/
13. https://orcid.org/
14. https://publons.com/
15. https://www.scimagojr.com/

Educational content

5. Methods of mastering the discipline (educational component)

Lectures

Lectures are aimed at:

- *providing modern, holistic, interdependent knowledge in the discipline "Theory of cognition and methods of information processing", the level of which is determined by the target setting for each topic;*
- *providing creative work of postgraduate students together with the teacher during the lecture;*
- *education of postgraduate students of professional and business qualities and development of their independent creative thinking;*
- *formation of the necessary interest in graduate students and providing direction for independent work;*
- *definition at the current level of development of science in the field of theory of knowledge and methods of information processing*
- *reflection of methodical processing of material (selection of the main provisions, conclusions, recommendations, clear and adequate to their formulations);*
- *use for demonstration of visual materials, combination, if possible, with demonstration of research results*
- *teaching research materials in clear and high-quality language with respect to structural and logical connections, explanation of all newly introduced terms and concepts*
- *accessibility for perception by this audience.*

№ s / n	*Title of the lecture topic and list of main questions (list of teaching aids, references to literature and tasks on VTS)*	*Hours*
1	*Lecture 1. Sources of knowledge. Sensory experience and rational thinking. Sensualism and rationalism* *Literature [3]* *Tasks for VTS: Basic forms and ways of interaction of forms of thinking.*	2
2	*Lecture 2. Possibilities and limits of cognition.* *Literature [3]* *Tasks for VTS: Agnosticism*	2
3	*Lecture 3. The essence of the process of cognition. Cognition as a reflection of reality.* *Literature [3]* *Tasks for VTS: Construction of the object of knowledge*	2
4	*Lecture 4. Subject and object of cognition* *Literature [3]* *Tasks for VTS: Object as a given and object as a structure*	2
5	*Lecture 5. Concepts of truth* *Literature [3]* *Tasks for VTS: Criteria of truth*	2
6	*Lecture 6. Scientific information. Traditional sources of information*	2

	Literature [1] *VTS Tasks: Visual Information*	
7	*Lecture 7. Scientific document. Primary information. Secondary information* *Literature [1]*	*2*
8	*Lecture 8. Resource https://www.sciencedirect.com/. Features of the resource and available scientific information* *References [1, 2, 4]* *VTS Tasks: Advanced search capabilities on the resource*	*2*
9	*Lecture 9. Resource https://www.springer.com/gp. Features of the resource and available scientific information* *Literature [1, 2]* *VTS Tasks: Advanced search capabilities on the resource*	*2*
10	*Lecture 10. Resource www.scopus.com. Features of the resource and available scientific information* *Literature [1, 2]* *VTS Tasks: Advanced search capabilities on the resource*	*2*
11	*Lecture 11. Resource https://clarivate.com/products/web-of-science/ Features of the resource and available scientific information* *Literature [1, 2]* *VTS Tasks: Advanced search capabilities on the resource*	*2*
12	*Lecture 12. Resource www.scholar.google.com.ua Features of the resource and available scientific information* *Literature [1, 2]* *VTS Tasks: Advanced search capabilities on the resource*	*2*
13	*Lecture 13. Resource www.doaj.org Features of the resource and available scientific information* *Literature [1, 2]* *VTS Tasks: Advanced search capabilities on the resource*	*2*
14	*Lecture 14. Resource www.narcis.nl Features of the resource and available scientific information* *Literature [1, 2]* *VTS Tasks: Advanced search capabilities on the resource*	*2*
15	*Lecture 15. Resource https://www.crossref.org/ Features of the resource and available scientific information* *Literature [1, 2]* *VTS Tasks: Advanced search capabilities on the resource*	*2*
16	*Lecture 16. Resource http://www.nbuv.gov.ua Features of the resource and available scientific information* *Literature [1, 2]* *VTS Tasks: Advanced search capabilities on the resource*	*2*
17	*Lecture 17. Resource https://www.researchgate.net/ Features of the resource and available scientific information* *Literature [1, 2]* *VTS Tasks: Advanced search capabilities on the resource*	*2*
18	*Lecture 18. Statistical methods of information processing* *Literature [1, 2]* *Tasks for VTS: Statistical analysis of selected information*	*2*
	Total	***18***

Practical training

In the system of professional training of graduate students in this discipline, practical classes occupy 33% of the classroom workload. As a supplement to the lecture course, they lay and form the basis of postgraduate qualifications. The content of these classes and methods of conducting them should ensure the development of creative activity of the individual. They develop technical thinking and the ability to use special terminology, allow you to test knowledge, so this type of work is an important means of operational feedback. Practical classes should perform not only cognitive and educational functions, but also promote the growth of students as creative workers.

The main tasks of the cycle of practical classes:

- *to help graduate students to systematize, consolidate and deepen theoretical knowledge in the field of theory of cognition, search and information processing;*
- *to teach graduate students techniques for solving practical problems, to promote the acquisition of skills and abilities to perform calculations, graphics and other tasks;*
- *to teach work with scientific and reference literature;*
- *to form skills learn independently, ie master the methods, techniques and techniques of self-learning, self-development and self-control.*

№ s / n	***The name of the topic of the practical lesson and a list of basic questions (list of didactic support, references to literature and tasks on VTS)***	***Hours***
1	*Practical lesson 1.* *Choice and substantiation of research methods on the topic of the graduate student's dissertation* *Literature: [1, 3]*	*2*
2	*Practical lesson 2.* *Selection and substantiation of the subject and object of research on the topic of the graduate student's dissertation* *Literature: [1, 3]*	*2*
3	*Practical lesson 3.* *Search for printed sources of information on the topic of the graduate student's dissertation* *Literature: [1, 3]*	*2*
4	*Practical lesson 4.* *Search for sources of information on the topic of the graduate student's dissertation on resources https://www.sciencedirect.com/. andhttps://www.crossref.org/* *Literature: [1, 3]*	*2*
5	*Practical lesson 5.* *Search for sources of information on the topic of the graduate student's dissertation on resources www.scopus.com and https://clarivate.com/products/web-of-science/* *Literature: [1, 3]*	*2*
6	*Practical lesson 6.* *Search for sources of information on the topic of the graduate student's dissertation on resources www.scholar.google.com.ua and www.doaj.org* *Literature: [1, 3]*	*2*
7	*Practical lesson 7.* *Search for sources of information on the topic of the graduate student's dissertation on resources www.narcis.nl and http://www.nbuv.gov.ua* *Literature: [1, 3]*	*2*

8	*Practical lesson 8.* *Search for contacts with foreign researchers in the direction of the graduate student's dissertation with the help of the resource https://www.researchgate.net/* *Literature: [1, 3]*	*2*
9	*Test*	*2*
	Together	*18*

6. Independent work of a graduate student

Independent work takes 64% of the time to study the discipline, including preparation for the test, modular test work and preparation of the abstract. The main task of independent work of students is to master the knowledge of the course, which is not included in the list of lecture questions by personal search for information, the formation of an active interest in the creative approach in educational work. . In the process of independent work within the educational component, the graduate student must learn to analyze modern approaches to the process of cognition and search and analysis of information

№ s / n	*The name of the topic that is submitted for independent study*	*Number of hours of VTS*
1	*Section 1. Theory of cognition.* *Basic forms and ways of interaction of forms of thinking. Agnosticism. Construction of the object of cognition. Object as a given and object as a construction. Criteria of truth* *Literature [1, 3]*	*10*
2	*Section 2. Scientific information* *Using the capabilities of advanced search of leading network resources to search for information in the direction of the dissertation of graduate students* *References [additional 1-14]*	*60*
3	*Section 3. Methods of information processing.* *Statistical processing of the found information in the direction of the postgraduate dissertation*	*20*
6	*Preparation for the test*	*6*
	Hours in general	*96*

Based on the results of independent work, a report on the graduate student's independent work on a credit module is compiled, which includes bibliographic sources of scientific information found on the topic of the graduate student's dissertation (at least 50 sources) and primary statistical data processing on found information sources. and experimental studies, etc.).

Policy and control

7. Course policy (educational component)

Rules for attending classes and behavior in class

Attendance is a mandatory component of assessment. Students are obliged to take an active part in the learning process, not to be late for classes and not to miss them without good reason, not to interfere with the teacher to conduct classes, not to be distracted by actions that are not related to the learning process. When solving problems in practical classes, students can use any source of information and computational tools. All tasks are performed individually.

Rules for assigning incentive and penalty points

- *Incentive points can be awarded by the teacher only for the performance of creative work in the discipline or additional online profile courses with a certificate:*
But their amount cannot exceed 25% of the rating scale.
- *penalty points within the academic discipline are not provided.*

Policy of deadlines and rearrangements
In the event of arrears of the discipline or any force majeure, students should contact the teacher through available (provided by the teacher) communication channels to resolve issues and agree on an algorithm for practice.

The policy of academic integrity
Plagiarism and other forms of dishonesty are not allowed. Plagiarism includes the lack of references to the use of printed and electronic materials, citations, opinions of other authors. Inadmissible hints and write-offs when writing tests, conducting classes; passing the exam for another graduate student; copying of materials protected by the copyright system without the permission of the author of the work.
The policy and principles of academic integrity are defined in Section 3 of the Code of Honor of the National Technical University of Ukraine "Kyiv Polytechnic Institute named after Igor Sikorsky". Read more:https://kpi.ua/code

Policy of academic behavior and ethics
Students must be tolerant, respect the opinions of others, formulate objections in the correct form, constructively maintain feedback in class.
Norms of ethical behavior of students and employees are defined in Section 2 of the Code of Honor of the National Technical University of Ukraine "Kyiv Polytechnic Institute named after Igor Sikorsky". Read more:https://kpi.ua/code

8. Types of control and rating system for evaluation of learning outcomes (RSO)

Distribution of study time by types of classes and tasks in the discipline according to the working curriculum:

Semester	Training time		Distribution of teaching hours				Control measures		
	Loans	acad. year	Lectures	Practical	Lab. slave.	CPC	MCR	Ref.	Semester control
4	5	150	36	18	-	96	-	-	test

The student's rating in the discipline consists of points that he receives for: performing 8 practical tasks in practical classes and a report for independent work ..
Semester control is a test.

System of rating (weight) points and evaluation criteria

Rating points system and evaluation criteria:

Performing tasks in practical classes.

Weight score - 10. The maximum number of points for practical classes 10 · 8 = 80.

Execution and report on independent work. Weight score 20.

The test is based on the results of work in the semester.

A student who received at least 60 points in the semester can take part in the test to get a higher score. In this case, the points obtained by him in the test with the addition of 50% of the points obtained in the semester are final.

The test (if necessary) is evaluated with 70 points. The control task consists of two theoretical tasks.

Each task is evaluated with 35 points according to the following criteria:

- *excellent task performance, free possession of material on defense - 32-34 points.*
- *good level of performance, correct answers to questions when defending the task - 25-30 points.*
- *sufficient level of task performance, the presence of minor inaccuracies in the answers - 20-22 points.*
- *poor quality of work, ignorance of theoretical material - 0 points.*

The condition of the first certification is to obtain at least 20 points and perform 50% of practical work (at the time of certification). The condition of the second certification is to obtain at least 36 points and perform 75% of practical work (at the time of certification).

The sum of the points received by the student is transferred to an examination estimation according to the table:

Scores	***Rating***
95 ... 100	*perfectly*
85 ... 94	*very good*
75 ... 84	*fine*
65 ... 74	*satisfactorily*
60 ... 64	*enough*
RD <60	*unsatisfactorily*
Admission conditions are not met	*not allowed*

9. Additional information on the discipline (educational component)

An approximate list of questions that are submitted for semester control

1. *Explain what determines the boundaries of knowledge*
2. *Analyze the differences between the positions of skepticism and agnosticism*
3. *Explain the features of cognition as a reflection.*
4. *Analyze current trends in understanding the essence of the process of cognition.*
5. *Analyze the main features of the sensualist position of the theory of cognition.*
6. *Analyze the main features of the rationalist position of the theory of cognition.*
7. *Explain the term object of cognition*
8. *Explain the term subject of cognition*
9. *Explain existing concepts of truth*
10. *Explain the concept of truth criterion*
11. *List the advantages and disadvantages of the information resource https://www.sciencedirect.com/*
12. *List the advantages and disadvantages of the information resourcehttps://www.springer.com/gp*
13. *List the advantages and disadvantages of the information resource www.scopus.com*

14. *List the advantages and disadvantages of the information resource*https://clarivate.com/products/web-of-science/
15. *List the advantages and disadvantages of the information resource*www.scholar.google.com.ua
16. *List the advantages and disadvantages of the information resource*www.doaj.org
17. *List the advantages and disadvantages of the information resource*www.narcis.nl
18. *List the advantages and disadvantages of the information resource* https://royalsociety.org
19. *List the advantages and disadvantages of the information resource*http://www.nbuv.gov.ua
20. *List the advantages and disadvantages of the information resource*https://www.crossref.org/
21. *List the advantages and disadvantages of the information resource*https://www.researchgate.net/

Work program of the discipline (syllabus):

Folded Associate Professor, Ph.D., Gulienko Sergey Valerievich

Approved at the meeting of the Department of Machines and Apparatus of Chemical and Oil Refining (Protocol № 26 of 19 June 2021)

Agreed metodic commission of the Faculty of Engineering and Chemistry (Protocol № 11 of June 25, 2021)