Introduction to Analytical Sociology

Work program of the academic discipline (Syllabus)

Details of the discipline

Higher education level	*Second (Master's)*
Field of Knowledge	*05 Social and Behavioral Sciences*
Specialty	*054 Sociology*
Educational program	*Social Data Analytics*
Discipline status	*Mandatory*
Form of study	*full-time (full-time)*
Year of preparation, semester	*1 year, 1 semester*
Scope of discipline	*2 credits (60 hours):* *lectures – 18 hours, seminars – 18 hours, student's independent work – 24 hours.*
Semester control / control measures	*Test, Modular control work, Home work*
Class schedule	*http://roz.kpi.ua/*
Language of instruction	*English*
Information about the course leader / teachers	*Lecturer: Doctor of Pedagogical Sciences, Professor Panchenko Liubov Feliksivna, +380963352397, lubov.felixovna@gmail.com* *Practical / Seminar: Panchenko Liubov Feliksivna* *Laboratory: Panchenko Liubov Feliksivna*
Course placement	*https://do.ipo.kpi.ua/course/view.php?id=6986*

Program of the discipline

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

Within the framework of the discipline, students will gain knowledge of the essence of analytical sociology, the directions of its development, the capabilities of its tools: network analysis and computer modeling. The planned types of training classes include lectures, practical and laboratory work, modular control work, home control work.

The aim of the discipline is to develop students' abilities to choose adequate methods and use the tools of analytical sociology to analyze sociological data and research data, in particular peace and conflict studies.

The main tasks of the discipline
– to provide students with the main information about the essence of analytical sociology, the directions of its development;
– to form an idea of network analysis and computer modeling as tools of analytical sociology;
– to teach them to correctly use the capabilities of computer tools for network analysis and multi-agent modeling;

– to form the need for further development of knowledge and skills in the field of application of methods of analytical sociology.

After mastering the academic discipline, undergraduates must demonstrate the following learning outcomes:

KNOWLEDGE:

- the essence of analytical sociology, the directions of its development, the connection of analytical sociology with theories of the middle level
- the essence of social networks as a tool of analytical sociology, the mathematical foundations of networks, the features of designing network research, the characteristics of individual nodes and the network as a whole,
- capabilities of computer tools for analysis and visualization of social networks Gephi and Ucinet
- basics of computer modeling, multi-agent systems, computer tools for multi-agent modeling, in particular Netlogo

SKILLS:

- to determine the class of tasks in sociology, in particular the analysis of peace and conflicts, for which it is necessary to apply the methods of analytical sociology
- to use social network analysis and multi-agent modeling in their own sociological research
- choose methods adequate to the tasks;
- use modern software tools for the social networks analysis and statistical processing of information;
- present the results of the study using computer events (including on the Internet).

Thus, the following general and professional competencies and learning outcomes from the educational and scientific program are formed in the educational component:

– GC01 Ability to abstract thinking, analysis and synthesis.
– PC01 Ability to analyze social phenomena and processes.
– PC02 Ability to identify, diagnose and interpret social problems of Ukrainian society and the world community.
– PR01 Analyze social phenomena and processes using empirical data and modern concepts and theories of sociology.
– PR02 To diagnose and interpret the social problems of Ukrainian society and the world community, the causes of their occurrence and consequences.
– PR04 Apply scientific knowledge, sociological and statistical methods, digital technologies, specialized software to solve complex problems of sociology and related fields of knowledge
– PR05 Search, analyze and evaluate the necessary information in scientific literature, data banks and other sources.

2. Pre-requisites and post-requisites of the discipline (place in the structural and logical scheme of training according to the relevant educational program)

The discipline is based on students' knowledge of general sociology, methodology and methods of sociological research, mathematical and statistical methods of analysis of sociological information.

The study of the discipline provides the necessary theoretical and methodological basis for further study of the course "Methodology and Methods of Sociological Research in the Digital Age".

Content of the discipline

Distribution of study time for the educational component

Form of study	Educational component	Total		Distribution of study time by types of classes			Semester certification
		Credits	hours	Lectures	Practical classes	Independent work	
Daytime	*1*	*2*	*60*	*18*	*18*	*24*	*Test*

Chapter titles, topics	Total hours	Distribution of study time by types of classes			
		Lectures	Practical (Seminars)	Laboratory	Independent work
Topic 1. The essence of analytical sociology.	3	2	1	0	0
Topic 2. Analytical sociology and middle-level theories.	3	2	1	0	0
Topic 3. Social mechanisms.	5	2	2	0	1
Topic 4. Network research design.	5	2	2	0	1
Topic 5. Mathematical foundations of networks.	4	2	2	0	0
Topic 6. Visualization of networks in Gephi.	5	2	2	0	1
Topic 7. Network data management in Ucinet.	5	2	2	0	1
Topic 8. Computer modeling in sociology.	3	2	1	0	0
Topic 9. The future of analytical sociology.	3	2	1	0	0
Home test	10				10
Modular control work	6		2		4
Test	8		2		6
Total	60	18	18	0	24

3. Training materials and resources

Recommended Reading

Basic literature

1. Hrushetskyi A., Paniotto V. War and Transformation of Ukrainian Society (2022 - March 2025). Kyiv, Spirit and Letter, 2025.
2. Kislova, O. M. Digital methods in sociology. Bulletin of Science and Education, 2022, (3), 3.

3. Complex measuring tools in sociological research: development, adaptation, justification of reliability / E. Holovakha, S. Dembitsky, N. Panina et al.; for Science. Ed. E. Holovakha and S. Dembitsky. Kyiv: Institute of Sociology of the National Academy of Sciences of Ukraine, 2022.

4. Sociology: Theories of the Middle Level: Textbook. Ed. Y. F. Pachkovsky [N. V. Kovalisko, T. D. Lapan, N. Y. Chernysh et al.]. Kyiv: "Caravela", 2020. 356 p. (in Russian).

5. Stephen P Borgatti, Martin G Everett, Jeffrey C Johnson. Analyzing Social Networks. 2nd Edition. 2018. https://books.google.com.ua/books?id=XD1ADwAAQBAJ&pg=PT103&hl=ru&source=gbs_selected_pages&cad=1#v=onepage&q&f=false

6. Uri Wilensky, William Rand-An Introduction to Agent-Based Modeling with NetLogo-The MIT Press (2015) https://www.jstor.org/stable/j.ctt17kk851?turn_away=true https://www.intro-to-abm.com/#models

7. Flache, A., & de Matos Fernandes, C. A. (2021). Agent-Based Computational Models. In G. Manzo (Ed.), Research Handbook on Analytical Sociology (pp. 453-473). (Research Handbooks in Sociology). EdwardElgar Publishing; Cheltenham. https://doi.org/10.4337/9781789906851.00033 https://www.elgaronline.com/edcollchap-oa/book/9781789906851/book-part-9781789906851-33.xml

Further reading

1. Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. Ucinet 6 for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies.

2. Joshua M. Epstein. Generative Social Science Studies in Agent-Based Computational Modeling. Princeton University Press.2006. https://ocw.tudelft.nl/wp-content/uploads/GenerativeScienceEpstein_01.pdf

3. Johnson, J. C., Boster, J. S., & Palinkas, L. A. (2003). Social roles and the evolution of networks in extreme and isolated environments. The Journal of Mathematical Sociology, 27(2-3), 89–121. doi:10.1080/00222500305890

4. Panchenko,L., Samovilova. N. Secondary data analysis in educational research: opportunities for PhD students. Proc. Ith Int. Conf. ICHTML 2020. SHS Web of Conferences 75, 04005 (2020) https://doi.org/10.1051/shsconf/20207504005

5. Oxford Handbook on Analytical Sociology. 2011.

6. Panchenko, L. F., Khomiak, A. O., & Pikilnyak, A. V. (2020). Using twitter in ukrainian sociology majors training. Paper presented at the CEUR Workshop Proceedings, 2643 253-263.

7. Panchenko, L., & Khomiak, A. (2020). Education statistics: Looking for a case-study for modelling. Proc. 16th Int. Conf. ICTERI 2020. Paper presented at the CEUR Workshop Proceedings, 2732 948-963 http://ceur-ws.org/Vol-2732/20200948.pdf (Scopus)

8. Social-Behavioral Modeling for Complex Systems. Edited by Paul K. Davis. Willey. 2019.

9. Vikram Deshmukh. Modeling Human Migration Dynamics in Netlogo https://scholarworks.sjsu.edu/cgi/viewcontent.cgi?article=1621&context=etd_projects

10. Paniotto, V., Hrushetsky, A. Is Modeling Not Dead Yet? History of Social Modeling in Ukraine and Agent-Oriented Approach on the Example of Forecasting the Language Situation in Ukraine. — Modern methods of collecting and analyzing data in sociology / By scientific ed. E. I. Holovakha and T. Y. Lyubiva. – Kyiv: Institute of Sociology of the National Academy of Sciences of Ukraine, 2013. – 140 p. (in Russian).

11. Panchenko L. F. Analysis of Social Networks as a Direction of Educational Measurements // Scientific Journal of the National Pedagogical University named after M. P. Drahomanov. Series No. 5. Pedagogical Sciences: Realities and Prospects. – Issue 41: Collection of Scientific Papers / ed. Prof. V. P. Sergienko. – Kyiv: Drahomanov National Pedagogical University Publ., 2013. – P. 111 – 117.

12. Panchenko L.F. Literacy in the field of data: definitions, approaches, directions of formation // Bulletin of the National Technical University of Ukraine "Kyiv Polytechnic Institute". Political science. Sociology. Law: collection. Sciences. works. – Kyiv, 2019. – № 3 (39). – P.82–94. DOI: https://doi.org/10.20535/2308-5053.2019.3(43).195703

13. Panchenko L.F. On the Question of the Use of Quantitative Methods in Conflict Studies // Bulletin of the National Technical University of Ukraine "Kyiv Polytechnic Institute". Political science. Sociology. Law: collection. Sciences. works. – Kyiv, 2018. – No 3 (39). – P.21–27.

14. Panchenko L.F. Mathematical and Statistical Methods of Analysis of Sociological Information. K., KPI. Igor Sikorsky, 2018.

15. Panchenko L.F. Preparation of future sociologists for computer analysis of demographic processes and structures // Information Technologies and Learning Tools. – 2018. – Vol.65(3). – C.166–183.

16. Panchenko L.F. Problems of Application of Multi-Agent Systems in the Training of Future Specialists in Information Technologies / L.F. Panchenko, N.O. Lavrynenko // Scientific Notes of Berdyansk State Pedagogical University. Pedagogical Sciences: Collection. Sciences. Pr. – Berdyansk, 2015. – Vol.3. – P.224– 230.

17. Environment R (R–project) http://www.r-project.org/about.html.

Educational content

4. Methods of mastering the academic discipline (educational component)

Training classes in the discipline "Introduction to Analytical Sociology" are held in the form of lectures and practical. At the lectures, the teacher introduces undergraduates to the essence and purpose of analytical sociology, computer tools that are used as its tools: multi-agent systems, means of analyzing social networks. Lectures are held in a dialogue form using multimedia presentations, questions and discussion. Practical and laboratory classes are held using computer devices, where undergraduates perform the tasks of a computer workshop in the environments of Netlogo, Gephi, Ucinet, R. Modular test work is offered in the following options: essays on the essence and capabilities of analytical sociology, research of models in the field of social sciences from the Netlogo model library, answers to theoretical questions of the course.

All classes are accompanied by materials and tasks in the Moodle distance learning system.

Topics and content of lectures

Lecture 1. The essence of analytical sociology. Purpose of analytical sociology. Explanation of the mechanism. Structural individualism. Reaching causal depth. Micro-macro connections. Purpose, objectives and structure of the course "Introduction to Analytical Sociology".

Lecture 2. Analytical sociology and theories of the middle level. Modern embodiments of Robert C. Merton's concept of middle-level theory. Characteristics of middle-level theory. Two types of components of explanation: explanandum or what needs to be explained, and explanance or what explanandum should explain. Isolation as a certain kind of abstraction. Generality, isolation and defining characteristics of middle-range theories. Four different kinds of relations: causal laws; statistical associations; counterfactual dependencies; causal mechanisms.

Lecture 3. Social mechanisms. Emotions. Beliefs. Preferences. Opportunities. Heuristics. Communities. Emotions. Rational choice and emotional choice. Is there a direct influence of emotions on action. The influence of emotions on preferences. The influence of emotions on formal preferences. The influence of emotions on the formation of faith and the collection of information. General, relatively universal mechanisms for forming beliefs. The main ways to form beliefs.

Lecture 4. Network research design. What are networks. Nodes, node attributes. Types of connections in networks. Relational events (similarities, relational roles, relational cognition) and relational relationships (interactions, flows). Levels of analysis: at the level of dyads, individual nodes, networks. Examples of research questions. Independent and dependent variables in network research.

Lecture 5. Mathematical foundations of networks. Graph notation. Paths. walks, paths. Bridges. Network components. Contiguity matrices. Incidence matrix.

Lecture 6. Networks Visualization in Gephi. Purpose of the program. Features. Interface. File formats that are supported. Import and export of files. Adding nodes. Adding edges. Calculations of node parameters. Indicators of network centrality. Filtering. Example of work.

Lecture 7. Network data management in Ucinet. Purpose of Ucinet. Data Import. Matrix Format. List Format. Numeric Data Purification. Data Transformation: Transpose, Accounting for Missing Data, Symmetry, Dichotomization, Combined Relationships, Combination of Nodes, Subgraphs, Normalization. Data of Cognitive Social Structure. Mapping of Attributes and Networks. Conversion of Attributes to Matrices. Data Export. Data Visualization by Netdraw Tools.

Lecture 8. Computer modeling in sociology. Multi-agent systems. Components of multi-agent systems. Rules of behavior of agents. Building multi-agent systems by means of NetLogo. Purpose of Netlogo. Interface. Library of models. Shells, spots, browser. Research of ready-made models. Making changes to models. Creating models. Form editor. Netlogo commands.

Lecture 9. The Future of Analytical Sociology. The Core of Analytical Sociology. Theoretical Developments. On the Benefits of Deliberate Explanations. The Structure of Social Interaction. What's Next: The Revolution in the Social Sciences.

Seminar classes

Seminar lesson 1. The essence of analytical sociology. Analytical sociology and middle-level theories.
Lesson plan:
1. Basic concepts of analytical sociology: explanation of mechanisms, structural individualism.
2. Discussion of micro-macro relationships in sociological research.
3. Analysis of the purpose and objectives of the course "Introduction to Analytical Sociology".
4. Robert Merton's Concept of Intermediate Level Theory: Main Ideas and Meaning.
5. Analysis of two types of explanatory components: explanandum and explanance.
6. A discussion about the generality, isolation and defining characteristics of mid-range theories.

Seminar lesson 2. Social mechanisms: emotions, beliefs and preferences.
Lesson plan:
1. The influence of emotions on social actions: is there a direct influence?
2. Formation of beliefs and collection of information: basic mechanisms.
3. Discussion about the role of emotions in decision-making and belief formation.

Seminar lesson 3. Network research design.
Lesson plan:
1. Basics of network analysis: nodes, node attributes, types of links.
2. Analysis of relational events and relationships: similarities, interactions, flows.
3. Determination of dependent and independent variables in network research.

Seminar lesson 4. Mathematical foundations of networks.
Lesson plan:
1. Basic concepts of graph theory: paths, paths, walks.
2. Analysis of network structures: bridges, network components.
3. Working with adjacency matrices and incidence matrices.

Seminar lesson 5. Social media visualization in Gephi.
Lesson plan:
1. Introduction to the Gephi interface and basic functions.
2. Practical work: importing, exporting files, adding nodes and edges.
3. Calculation of node parameters, centrality indicators and data filtering.

Seminar lesson 6. Network data management by means of Ucinet.

Lesson plan:
1. Familiarization with the Ucinet interface and basic data formats.
2. Practical skills: import, cleaning, transforming and normalizing data.
3. Visualization of network structures in NetDraw.

Seminar lesson 7. Computer modeling in sociology. The future of analytical sociology.
Lesson plan:
1. Fundamentals of Multi-Agent Modeling in Sociology.
2. Introduction to NetLogo: interface, model library.
3. Practical work on creating and modifying models.
4. The main directions of development of analytical sociology.
5. Discussion of the role of social mechanisms in modern research.
6. Future Challenges and Prospects of Analytical Sociology.

Seminar lesson 8. Modular control work

Seminar lesson 9. Test

5. Independent work of a student/postgraduate student

Types of independent work: preparation for practical classes (viewing the materials of the current lecture), completing tasks for independent work, work on educational platforms. All deadlines are given in the Moodle system weekly.

Discipline policy

6. Policy of the academic discipline (educational component)

Incentive points

Incentive points	
Criterion	Weight Score
Participation in the conference / Publication of abstracts	5 points
Publication of a scientific article	10 points

Attending classes

Attending lectures and seminars is mandatory.

Missed assessment control measures

The missed modular test work can be written again, but before the intermediate certification is affixed, taking into account the time required by the teacher to check the work.

Procedure for appealing the results of control assessment measures

Students have the opportunity to raise any issue related to the control procedure and expect it to be dealt with according to predetermined procedures. To appeal against control measures, the student must submit an application, which must indicate the reason for the appeal, the facts of the teacher's bias. The teacher should discuss this application with the student personally at the consultation. The commission may

decide to hold the control measure again, or reject the application. The decision of the commission is final and cannot be appealed.

Calendar boundary control

At the first attestation, the student receives "attested" if his current rating at the time of attestation is 20 or more points.

At the second attestation, the student receives "attested" if his current rating at the time of attestation is 40 or more points. If this indicator does not meet the requirements, "not certified" is issued.

The development of "non-certification" is carried out in consultations with the teacher by verbally answering the questions of the material not mastered by the student and demonstrating the practical and laboratory work performed.

Academic integrity

The policy and principles of academic integrity are defined in Section 3 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". Read more: https://kpi.ua/code.

Norms of ethical behavior

The 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 "Igor Sikorsky Kyiv Polytechnic Institute". Read more: https://kpi.ua/code.

7. Types of control and rating system for assessing learning outcomes (RSO)

No. s/p	Assessment control measure	%	Weight Score	Quantity	Total
1.	Performing practical work in a computer environment + report from the lab.	63	7	9	63
2.	Homework test – a case study on data analysis or work on educational platforms (Data Camp, Coursera, etc.)	20	20	1	20
3.	Modular control work (MKR)	17	17	1	17
	Total				100

Semester control: test
Conditions for admission to semester control: semester rating more than 40 points.

Scoring criteria

1. Modular control work. Weight score – 17 points.

- "excellent" – complete answer (at least 90% of the required information) – 16-17 points;
- "good" – a sufficiently complete answer (at least 75% of the required information), or a complete answer with minor inaccuracies of 1 3-15 points;
- "satisfactory" – incomplete answer (at least 60% of the required information) and minor errors – 10-12 points;
- "unsatisfactory" – the answer does not meet the requirements for "satisfactory" – 0-7 points.

2. The performance of practical work in the computer class is evaluated at 7 points according to the following criteria:

- "excellent", the task was completed in full (at least 90% of the required work), without significant errors. The student demonstrates confident mastery of the software, logically and consistently performs tasks, explains his actions with arguments and answers all the questions posed – 6-7 points;
- "good", the task is completed quite fully (at least 75% of the required work) or completely, but with minor errors. The student mostly understands the algorithm of work, makes some inaccuracies, corrects them after the teacher's prompts, answers most of the questions asked – 3-5 points;
- "satisfactory" – the task is partially completed (at least 60% of the required work), contains significant errors. The student is poorly oriented in the work, cannot correct mistakes on his own, answers questions uncertainly or cannot explain his actions – 4 points;
- "unsatisfactory" - work not done - 0-3 points.

3. Data Analysis Case Assessment (DOC) - 20 points
- "excellent", the task is completed in full (at least 90% of the required work), appropriate data analysis methods are used, a deep understanding of the problem is demonstrated. The student presents the results in a logical and structured way, draws reasonable conclusions, is able to interpret data and explain his approach. The case is optimized, correctly documented, correct visualizations are used – 1 9-20 points;
- "Good", the task was completed completely enough (at least 75% of the required work), appropriate methods of analysis were used, but there are minor inaccuracies or missed secondary aspects. The conclusions are logical, but they need to be clarified. The case contains some shortcomings or is not effective enough, data visualization is correct, but can be improved – 15-18 points;
- "satisfactory" – the task is partially completed (at least 60% of the required work), there are significant errors in the analysis or in the interpretation of the results. The methods used may not be entirely relevant, the conclusions are superficial or incomplete. The case contains significant errors, there is no explanatory documentation, data visualization is weak or incorrectly reflects the results of 12-14 points;
- "unsatisfactory" – the task is completed by less than 60%, or not completed at all. There is no logical justification for decisions, the methods of analysis are chosen incorrectly, the results are not interpreted or have critical errors. Data visualization is incorrect or absent - 0-5 points.

The condition for passing the first calendar control is to receive at least 20 points. The condition for positive passing of the second calendar control is to receive at least 40 points.

Students who have scored 60 or more points during the semester have the opportunity to:
- receive a credit grade (credit) in accordance with the rating (rating points are transferred to the grade according to the table and entered into the semester control sheet);
- perform a test work in order to increase the grade (in this case, the student's previous rating in the discipline is canceled and he receives a grade only based on the results of the test work).

Students who scored less than 60 points during the semester, but fulfilled the admission conditions, perform a credit test.

Answers to the test are evaluated in the amount of 100 points and are awarded for answers to 2 questions:
- complete answer/completed task (at least 90% of the required information) - 50-45 points;

- a sufficiently complete answer/completed task (at least 75% of the required information) - 44-38 points;
- incomplete answer/completed task (at least 60% of the required information) - 37-30 points;
- incomplete answer / uncompleted task (less than 60% of the required information) - 29-0 points.

Table of correspondence of rating scores to grades on the university scale:

Number of points	Evaluation
100-95	Excellent
94-85	Very good
84-75	Good
74-65	Satisfactory
64-60	Dostagno
Less than 60	Unsatisfactory
Not met the conditions of admission	Not allowed

8. Additional information on the discipline (educational component)

Non-formal education

It is possible to enroll certificates of completion of distance and online courses on the subject of the discipline, or individual modules of courses. In particular, it is recommended to study on educational platforms:

1) Data Camp: курси Introduction in R, Introduction to statistics with R, Statistics fundamental with R, case study Network Analysis in R
(https://campus.datacamp.com/courses/case-studies-network-analysis-in-r/exploring-graphs-through-time?ex=1
https://campus.datacamp.com/courses/case-studies-network-analysis-in-r/exploring-graphs-through-time?ex=6)

2) Coursera: Specialization Computational Social Science
(https://www.coursera.org/specializations/computational-social-science-ucdavis) та курс
Network Dynamics of Social Behavior (https://www.coursera.org/learn/networkdynamics)

To confirm the completion of informal training, the undergraduates must provide an appropriate document indicating the name of the courses and their volume in hours. Recognition of the results of non-formal education takes place in the manner determined in the relevant Regulations of Igor Sikorsky Kyiv Polytechnic Institute. Igor Sikorsky: https://osvita.kpi.ua/node/179

Work program of the academic discipline (syllabus):
Compiled by Professor of the Department, Doctor of Pedagogical Sciences, Professor Panchenko L.F.
Approved by the Department of ___sociology_____ (minutes No. 12 dated 24.05.2024)
Approved by the Methodological Commission of the Faculty (minutes No. 9 dated 26.06.2024)

Questions to prepare for the modular test

1. What is analytical sociology?
2. The main tasks of analytical sociology.
3. The essence of structural individualism.
4. The concept of micro-macro relationships in sociological analysis.
5. The role of explaining mechanisms in sociology.
6. Middle Level Theory: Definition and Meaning.
7. Differences between explanandum and explanance.
8. The main types of sociological explanations.
9. Isolation as a method of abstraction in sociological theories.
10. Causal mechanism in sociological research.
11. The influence of emotions on social behavior.
12. How can emotions change social preferences?
13. The main mechanisms of formation of beliefs.
14. The role of beliefs in social life.
15. Social networks: basic concepts and structure.
16. Types of social media connections.
17. Basic levels of social network analysis.
18. What are relational events and relational relationships?
19. Definition of the adjacency matrix and the incidence matrix.
20. The main indicators of centrality in network analysis.
21. The purpose of the Gephi app is in social media visualization.
22. Key features of Gephi for network analysis.
23. What is multi-agent modeling in sociology?
24. The main components of multi-agent systems.
25. How Does NetLogo Work and Its Main Features?
26. The concept of relational roles in network research.
27. The use of Ucinet in sociological research.
28. Data transformation methods in Ucinet.
29. Social media visualization in Netdraw.
30. Prospects for the development of analytical sociology.

Test questions
1. The main differences between analytical sociology and other sociological approaches.
2. How does analytical sociology explain social phenomena through mechanisms?
3. Definition of structural individualism and its importance in sociological research.
4. What is the difference between macroanalysis and microanalysis?
5. How does analytical sociology consider the interaction between individuals and social structures?
6. Main characteristics of intermediate-level theories.
7. What is the generality of mid-range theories?
8. Types of causal relations in sociological analysis.
9. How do statistical associations help in sociological research?
10. Counterfactual dependencies in sociological analysis.
11. The influence of emotions on the decision-making process.
12. How are social preferences formed?
13. The main mechanisms of changing beliefs.
14. The role of information in the formation of beliefs.
15. What is cognitive social structure?
16. Types of social network connections and their characteristics.
17. What Are Nodes and Node Attributes in Network Analysis?
18. Definition and classification of relational events.
19. The concept of relational cognition in social networks.
20. How are dyads and subgraphs analyzed in network studies?
21. Use of matrix methods in social networks.
22. What network parameters can be calculated in Gephi?
23. What is centrality in social networks and what are its types?
24. Methods of collecting and processing network data in Ucinet.
25. What kinds of data formats does Ucinet support?
26. How does NetLogo work in social interaction modeling?
27. What are the basic rules of agent behavior in multi-agent models?
28. The use of experimental modeling in sociology.
29. Modern Challenges and Trends in Analytical Sociology.
30. How Can Analytical Sociology Affect the Future of the Social Sciences?

Самостійна робота студентів