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

ЗБАГАЧУЄМО КОЖНОГО
КАФЕДРА СОЦІОЛОГІЇ

Department of Sociology

Social Network Analysis

Curriculum (Syllabus)

Course details

Level of higher education	***Second (Master's)***
Field of knowledge	*05 Social and behavioural sciences*
Specialisation	*054 Sociology*
Educational programme	*Social Data Analysis*
Status of discipline	*Selective*
Form of study	*Full-time (day)*
Year of study, semester	*1st year, spring semester*
Scope of the discipline	*4 ECTS credits/120 hours* *18 hours of lectures, 36 hours of practical classes, 66 hours of independent work.*
Semester assessment/assessment measures	*Test, Modular control work*
Class schedule	*https://schedule.kpi.ua/*
Language of instruction	*Ukrainian*
Information about course coordinator / lecturers	*Lectures, seminars: Doctor of Pedagogical Sciences, Professor Lyubov Feliksivna Panchenko, +380963352397, lubov.felixovna@gmail.com*
Course location	*https://do.ipo.kpi.ua*

Curriculum

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

The academic discipline "Social Network Analysis" is studied over one semester. The academic discipline belongs to the professional training cycle. The status of the academic discipline is elective. The scope of the academic discipline is 4 ECTS credits.

Students should gain knowledge and skills in network analysis and interpretation of the results of such analysis. The course covers modern information technologies and network visualisation tools.

After completing the course, students will be able to:

- navigate the history of the formation and development of approaches to the study of social networks;
- use basic concepts and categories of social network analysis;
- apply the main methods and techniques of social network research in the social sciences;
- work with computer tools for network data analysis (Gephi, NetLogo, R, NodeXL, PSPP);
- conduct comprehensive research on various types of social networks (interpersonal, organisational, digital, etc.);
- make informed choices about network analysis methods in line with research goals and objectives.

Mastering this discipline contributes to the strengthening of the following competencies and program learning outcomes:

- ZK01 Ability to think abstractly, analyse and synthesise
- FK01 Ability to analyse social phenomena and processes
- FK12 Ability to apply modern statistical methods, models, digital technologies, and specialised software for modelling social processes
- PR01 Ability to analyse social phenomena and processes using empirical data and modern concepts and theories of sociology
- PR13 Apply modern methods of sociological research in the context of the digitalisation of social relations

2. Prerequisites and post-requisites of the discipline (place in the structural-logical scheme of training under the relevant educational programme)

The discipline builds on students' knowledge from the course "Mathematical and Statistical Methods of Social Information Analysis," general sociology, and the methodology and methods of sociological research. The knowledge gained from this discipline can be used during research internships and in the preparation of master's theses.

3. Contents of the academic discipline

1. Introduction to social network analysis
2. Mathematical foundations of social network analysis
3. Analysis of network data using Node XL
4. Basics of working with Gephi
5. Designing network research
6. Data collection in network research
7. Multivariate methods of analysis in network research
8. Testing hypotheses in networks
9. Collecting and analysing Twitter network data

4. Teaching materials and resources

Recommended reading

Basic

1. Zaretskaya, O. O. (2023). Crisis narrative in social networks: psychological analysis. Psychological Studies, 2, 84-93. https://lib.iitta.gov.ua/id/eprint/736992/1/73-125-PBwww2.pdf
2. Kalashnikova L. Digitalisation of social relations: theoretical justification and empirical verification / L. Kalashnikova, L. Yarova // Information society and nature in the focus of sociological analytics: collective monograph / edited by A. Lobanova, L. Kalashnikova, I. Grabovets. - Kyiv, 2023. - P. 13-48. http://elibrary.kdpu.edu.ua/xmlui/handle/123456789/10687
3. Kyslova, O. M. (2022). Digital methods in sociology. Bulletin of Science and Education, (3), 3. https://www.researchgate.net/profile/Olga-Kislova-2/publication/364240162_Cifrovi_metodi_v_sociologii/links/6340585f9cb4fe44f30e13d3/Cifrovi-metodi-v-sociologii.pdf
4. Stephen P. Borgatti, Martin G. Everett, Jeffrey C. Johnson. Analysing Social Networks**.** 3rd Edition. 2024.

Supplementary

5. Derek L. Hansen, Ben Shneiderman, Marc A. Smith. Analysing social media networks with Nodexl: Insights from a connected world. 2nd edition. 2019.
6. Borgatti S.P. Ucinet for Windows: Software for Social Network Analysis / S.P.Borgatti, M.G. Everett, L.C Freeman. – Harvard, MA: Analytic Technologies, 2002.
7. Connect to Networks with NodeXL: The Official Guide. 2023. https://nodexl.com/product/free-book-english-connect-to-networks-with-nodexl-the-official-guide/

8. Wickham, H., Çetinkaya-Rundel, M., & Grolemund, G. R for Data Science: Import, tidy, transform, visualise, and model data (2nd ed.). 2023. https://r4ds.hadley.nz/
9. Panchenko L. F. Analysis of social networks as a direction of educational measurements / L. F. Panchenko // Scientific journal of the National Pedagogical University named after M. P. Dragomanov. Series No. 5. Pedagogical Sciences: Realities and Prospects. – Issue 41: Collection of Scientific Works / Edited by Prof. V. P. Sergienko. – Kyiv: M. P. Dragomanov National Pedagogical University Publishing House, 2013. – Pp. 111–117.
10. Barnett G. A. Measuring Quality in Communication Doctoral Education Using Network Analysis of Faculty-Hiring Patterns [Electronic resource] / George A. Barnett, James A. Danowski, Thomas Hugh Feeley, Jordan Stalker // Journal of Communication. – 2010. – V.60. – Issue 2. – P. 388–411. – Access mode: http://onlinelibrary.wiley.com/doi/10.1111/j.1460-2466.2010.01487.x/full
11. Gephi [Electronic resource]. – Access mode: https://gephi.org/
12. INSNA [Electronic resource]. – Access mode: http://www.insna.org/
13. McFarland D. Social Network Analysis Labs in R / Daniel, McFarland, Solomon Messing, Michael Nowak, Sean J. Westwood. – Stanford University. – 2010. [Electronic resource]. – Access mode: http://sna.stanford.edu/rlabs.php
14. Nopkins P. L. Simulation Hamlet in the classroom / Pamela Lee Hopkins [Electronic resource]. – Access mode: http://clexchange.org/ftp/documents/Roadmaps/RM1/D-4540-1.pdf
15. Pajek [Electronic resource]. – Access mode: http://pajek.imfm.si/doku.php
16. R (Crunch) [Electronic resource]. – Access mode: http://crunch.kmi.open.ac.uk/
17. SNAPP Social Networks Adapting Pedagogical Practice [Electronic resource]. – Access mode: http://www.snappvis.org
18. W. de Nooy. Exploratory Social Network Analysis with Pajek /W. de Nooy, A. Mrvar, V. Batagelj. – CUP, 2011. – 442 p.
19. Hanneman R. A. Introduction to social network methods / Robert A Hanneman, Mark Riddle. – Riverside, CA: University of California. – 2005. [Electronic resource]. – Access mode : http://faculty.ucr.edu/~hanneman/
20. Panchenko L. F. Preparing university students for social network analysis / L. F. Panchenko // Scientific Bulletin of Donbas. – 2012. – No. 4. – Access mode : http://nvd.luguniv.edu.ua/archiv/NN20/12plfasm.pdf
21. Panchenko L. F. On the use of quantitative methods in conflict studies // Bulletin of the National Technical University of Ukraine "Kyiv Polytechnic Institute". Political Science. Sociology. Law: collection of scientific works. – Kyiv, 2018. – No. 3 (39). – P. 21–27.
22. Panchenko L.F. The use of multi-agent systems in education / L.F. Panchenko // Bulletin of Luhansk Taras Shevchenko National University: Pedagogical Sciences. – 2011. – No. 13(224). – P. 23–30
23. Access mode: http://www.sociology.kpi.ua/literature - Department of Sociology, Igor Sikorsky Kyiv Polytechnic Institute

Educational content

5. Methodology for mastering the academic discipline (educational component)

Lectures

Lecture 1: Introduction to social network analysis

Main issues: definition and basic concepts of social network analysis (SNA). Key concepts of social networks: nodes, edges and networks. History of the development of social network analysis. Application of social network analysis in various fields: sociology, politics, business. The importance of networks for understanding social dynamics.

IW: Familiarisation with the basic concepts of social networks, preparation of a short essay on the importance of social networks in modern society.

Lecture 2: Mathematical foundations of social network analysis
Key topics: mathematical models used in social network analysis. Graph theory: vertices, edges, and graph types. Network density, centrality, and connectivity. Centrality using eigenvalues, betweenness, and closeness. Network metrics and their significance in SNA.
IW: Solving graph theory problems, analysing simple graphs, calculating network metrics for given structures.

Lecture 3: Network data analysis using NodeXL
Key questions: Overview of NodeXL as a tool for social network analysis. Main functions and capabilities of NodeXL. Importing data and constructing network graphs. Visualising networks with NodeXL. Analysing network structures and relationships using NodeXL.
IW: Using NodeXL to create and visualise your own network, analysing connection structures using data from open sources.

Lecture 4: Basics of working with Gephi
Key questions: Overview of Gephi software and its functional capabilities. Creating and visualising network graphs in Gephi. Using layout algorithms: force atlas, circular, and others. Applying filters and modularity classes in Gephi.
IW: Creating a graph using Gephi, using different algorithms to visualise networks and studying the results.

Lecture 5: Designing a network study
Key questions: principles of designing network research. Choosing a data collection method. Developing hypotheses for network research. Structural and behavioural networks. Evaluating the results of network research.
IW: Developing a network research plan, selecting data collection methods, and formulating hypotheses for researching a specific social network.

Lecture 6: Data collection in network research.
Key issues: data collection methods for network research. Overview of network data sources. Use of online platforms and APIs for data collection. Problems and challenges of data collection in social networks.
IW: Collecting data using APIs from Twitter or another social network, preparing a report on the collected data.

Lecture 7: Multivariate analysis methods in network research
Key topics: Multivariate analysis methods for social networks. Matrix methods in network analysis. Principal component analysis and its application to network data. Clustering and community detection in networks.
IW: Analysis of network data using principal component analysis and clustering to identify structural patterns in networks.

Lecture 8: Hypothesis testing in networks
Key questions: hypothesis testing in the context of network research. Statistical methods for network data analysis. Significance tests and their application in a network context. Identifying causal relationships in networks.
IW: Performing statistical analysis based on obtained network data to test hypotheses.

Lecture 9: Collecting and analysing Twitter network data
Key issues: Features of data collection from Twitter. Analysis of text data from Twitter using natural language processing tools. Identifying trends and emotions in tweets. Analysis of social interactions on Twitter.
IW: Analysis of tweets with specific hashtags using tools for text analysis and identification of trends in data.

Practical work

Practical work 1. Basics of working with NodeXL
Key questions: capabilities of the **NodeXL Excel** add-in for social network analysis, graph representation using edge lists, adjacency matrices, graph visualisation, and metric calculation
IW: representation of sociometric survey data using NodeXL.

Practical work 2. Network visualisation using NodeXL
Key issues: importing data from files containing the network; sorting, visualising the weighted network, calculating node metrics and finding important network actors
IW: building your own network from a list of edges and visualising it

Practical work 3. Data management and data filtering in NodeXL
Key issues: strategies for big data analysis, processing non-aggregated data (rows), data filtering, subgraph extraction
IW: using dynamic filters

Practical work 4. Clustering and grouping with NodeXL
Key questions: identifying groups in a network by filtering edges, automatic cluster identification, manually specifying clusters and their attributes
IW: Using the example of US senators' voting 1) find the senators with the highest centrality; 2) verify the fact that increasing the filtering threshold shows that the Democratic Party voted more as a bloc than the Republican Party

Practical work 5. Working with an email network in NodeXL and Gephi
Key questions: processing and visualising a network of emails in NodeXL using a historical example — a fragment of the email corpus of the energy company Enron, which became a symbol of crime and financial fraud in the US
IW: importing and visualising the email network in Gephi

Practical work 6. Multidimensional scaling and hierarchical clustering of network data
Key questions: capabilities of multidimensional analysis methods (multidimensional scaling and hierarchical cluster analysis SPSS applied to network data; creation of data files and their analysis using SPSS
IW: building a spatial map using multidimensional scaling for your own data

Practical work 7. Correspondence analysis in networks
Key issues: correspondence analysis as a visualisation technique similar to multidimensional scaling, but applied to bimodal data.
IW: Analyse an example of correspondence analysis and explain the interpretation of the resulting correspondence map.

Practical work 8. Correspondence analysis in networks
Key questions: Consider correspondence analysis using the example of Greenacre (1984) on the number of doctoral degrees obtained by field and year.
IW: Interpretation of correspondence analysis using the example of Greenacre (1984) on the number of doctorates obtained by field and year

Practical work 9. Obtaining and analysing Twitter network data using NodeXL
Key questions: building a network using NodeXL based on a Twitter search query, finding top users, users with the highest centrality, social intermediaries, etc.
IW: Describe the most popular URLs in your network; the most popular domains; the most popular hashtags in tweets; keywords; the most common words in tweets, word pairs

Practical work 10. Introduction to network analysis in R
Key questions: the statnet package in R, network visualisation and calculation of key characteristics: network size, density, geodesic distance, diameter, transitivity using the example of Jacob Moreno's embedded data
IW: systematisation of functions used in the form of a table: term, English name, essence; function in the statnet package.

Practical work 11. Visualisation of migration statistics data using Gephi
Key issues: searching for migration statistics data (https://migrationdataportal.org), importing this data into Gephi and visualising it in the form of a directed network graph.
IW: visualisation of migration statistics data for Ukraine for 2022-2025.

Practical work 12. Testing hypotheses about correlation in networks in the R environment
Key questions: testing hypotheses about correlation in a network using Paget and Ancell's data on relationships between Florentine families during the Renaissance.
IW: Specifics of correlation analysis in network data.

Practical work 13. Regression models in networks in the R environment
Key issues: building and interpreting regression models in networks using Paget and Ancell's data on relationships between Florentine families during the Renaissance.
IW: Features of applying regression analysis to test hypotheses in networks.

Practical work 14. Testing network hypotheses in the Ucinet environment.
Multivariate correlation in Ucinet. Testing dyadic hypotheses and monadic hypotheses.
IW: calculate the correlation of marriage and business networks of Florentine families in Ucinet.

Practical work 15. Obtaining YouTube data
Key questions: extracting YouTube data using Chrome browser add-ons; storing data for further analysis; viewing, exporting and verifying data
IW: obtaining data on your own topic.

Practical work 16. YouTube data analysis. Network modelling in the Netlogo system
Key questions: importing web scraping data into Gephi, calculating network indicators and visualising them; purpose of Netlogo; interface; model library. Developing and editing models. Network models: Small Worlds**,** Giant Component, Team Assembly, Virus on a Network, etc.

IW: visualisation of data obtained in previous work. Characteristics of the model of your choice: purpose, interface, simulation, research, understanding.

Practical class 17. Modular control work

Practical class 18. Test

6. Independent work of the student

Independent work of the applicant includes:
preparation for classroom sessions – 56 hours;
preparation for the Modular control work – 4 hours;
preparation for the test – 6 hours.
Total – 66 hours.

Types of independent work: preparation for practical classes (reviewing materials from the current lecture), completing assignments for independent work. All deadlines are listed in the Moodle system on a weekly basis.

Discipline policy

7. Academic discipline policy (educational component)

Classes in the discipline "Social Network Analysis" are conducted in the form of lectures and computer workshops. During the lectures, the instructor introduces students to the key concepts and basic methods used for network analysis. Lectures are held in a dialogue format using multimedia presentations, questions and discussion. In practical classes, students complete computer workshop tasks on social network analysis in NodeXL, Gephi, Ucinet, and other environments. Modular control work are designed to assess students' knowledge and skills in using network analysis in the subject area and using software tools for network data analysis and visualisation.

The course uses active and collective learning strategies, which are implemented using the following methods and technologies: problem-based learning methods; personality-oriented technologies, in particular case studies of network data analysis, information and communication technologies that stimulate student activity (multimedia presentations for lectures, creative tasks using Internet services, knowledge maps, infographics and storytelling).

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

Questions, discussions and dialogue are welcome in lectures and classes; an atmosphere of tolerance and respect for others is expected. Teachers and students are guided by the norms of ethical behaviour and the principles of academic integrity in teaching and learning (Code of Honour of Igor Sikorsky KPI). Students can contact the teacher for necessary assistance or consultation face-to-face or via email and social networks. Incentive points are added to the student's semester rating, which can reach a maximum of 100 points.

Class attendance

Attendance at lectures, practical classes and laboratory classes is compulsory.

Missed assessment tests

A missed module assessment can be retaken, but only before the interim assessment is marked, taking into account the time required by the teacher to check the work.

Procedure for appealing assessment results

Students have the opportunity to raise any issue related to the assessment procedure and expect it to be considered in accordance with pre-defined procedures. To appeal against an assessment, a student must submit a statement indicating the reason for the appeal and providing evidence of the teacher's bias. The teacher must discuss this application with the student in person during a consultation. If there is no agreement on the result of the assessment, a commission of teachers from the department is formed to evaluate the assessment procedure and the student's claims. The commission may decide to repeat the assessment or reject the application. The commission's decision is final and cannot be appealed.

University policy

Academic integrity

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

Standards of ethical conduct

The standards of ethical conduct for students and employees are defined in Section 2 of the Code of Honour of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". For more information: https://kpi.ua/code.

Artificial intelligence policy

The policy on the use of artificial intelligence and its principles are regulated by the order "Policy on the use of artificial intelligence for academic activities at Igor Sikorsky Kyiv Polytechnic Institute". For more information, please visit: https://osvita.kpi.ua/node/1225.

8. Types of control and the learning outcomes assessment rating system (LOAS)

Assessment and control measures

A student's grade in a discipline consists of points awarded for:

1. completion of practical work on a computer;
2. completion of Modular control work.

1. Practical work in the computer lab is assessed at 5 points.

The maximum number of points for all practical work is r_{pr}= 5 points * 14 = 70 points.

Assessment criteria:

- "excellent", the task is completed in full (at least 90% of the required work), without significant errors. The student demonstrates confident mastery of the software, performs the task logically and consistently, explains their actions in a reasoned manner and answers all questions asked – 5 points;
- "good" – the task is completed sufficiently (at least 75% of the required work) or completely, but with minor errors. The student mostly understands the algorithm of the work, makes some inaccuracies, corrects them after the teacher's prompts, answers most of the questions asked – 4 points;
- "Satisfactory" – the task is partially completed (at least 60% of the required work) and contains significant errors. The student is poorly oriented in the work, cannot correct errors independently, answers questions uncertainly or cannot explain their actions – 3 points;
- "unsatisfactory" – the work is not completed – 0-2 points.

2. Modular control work

Weighting – 30 points.

Answers are evaluated as follows:

- "excellent" – complete answer (at least 90% of the required information) – 27-30 points;
- "Good" – sufficiently complete answer (at least 75% of the required information), or complete answer with minor inaccuracies – 23-26 points;
- "satisfactory" – incomplete answer (at least 60% of the required information) and minor errors – 18-22 points;
- "unsatisfactory" – answer does not meet the requirements for "satisfactory" – 0-17 points.

3. Bonus points

A total of no more than 10 points for the following types of work:

- for research activities (participation in conferences, student competitions, publications);
- participation in faculty competitions in the discipline and all-Ukrainian competitions.

The rating assessment for the academic discipline is communicated to applicants during the examination session.

Applicants with a rating of 60 points or more receive a grade corresponding to their rating without additional tests.

For applicants with a rating of less than 60 points, as well as those who wish to improve their rating, the teacher conducts a semester assessment in the form of a test or interview.

4. Credit.

Weighting score – 100.

The test consists of a list of questions that the student must answer. The questions vary in content and correspond to the topics covered in lectures, seminars, independent work, and self-assessment questions.

Assessment criteria

95-100 points - the student demonstrates a deep knowledge of the content of the course material, the ability to systematically and interdisciplinarily analyse the issues covered in the course; freely and correctly uses scientific concepts and terms, formulates logical, reasoned conclusions, and expresses their own well-founded position on controversial issues;

85-94 points - the student demonstrates a very good level of mastery of the course material, is well versed in the main topics of the course, is capable of analysis and generalisation; there may be isolated inaccuracies in formulations or examples that do not significantly affect the overall level of the answer;

75-84 points - the student demonstrates a fairly complete understanding of the main topics and issues of the course. Uses basic scientific terminology, but the analysis is mainly descriptive; conclusions are formulated, but not always sufficiently substantiated;

65-74 points - the student demonstrates a general understanding of the course material, but the answers contain noticeable inaccuracies in definitions, examples or logic of presentation; the use of scientific terminology is limited, the analytical component is weak;

60-64 points - the student demonstrates fragmentary knowledge of individual topics of the course, is familiar only with some of the key concepts; answers are incomplete, superficial, conclusions are insufficiently substantiated or absent;

0-59 points - the student is not familiar with the key concepts and issues of the course, demonstrates superficial or chaotic knowledge; analytical thinking and the ability to apply the knowledge gained are absent; answers are illogical or incomplete.

The student is unable to answer. The questions vary in content and correspond to the topics of lectures, seminars, independent work, and self-assessment questions.

Conditions for a positive interim assessment:
To receive a "pass" on the first interim assessment, the student must have at least 10 points; to receive a "pass" on the second interim assessment, the student must have at least 20 points.

Conditions for admission to the exam:
The condition for a student's admission to the exam is the completion of the Modular control work.

Table of correspondence between rating points and grades on the university scale:

Rating of the applicant (points)	University scale of grades for the level of acquired competencies (learning outcomes)
100-95	Excellent
94	Very good
84	Good
74-65	Satisfactory
64-60	Sufficient
Less than 60	Unsatisfactory

Possible marks in the semester control report:

Not admitted	Failure to meet the conditions for admission to semester control
Removed	Violation of the principles of academic integrity or moral and ethical standards of conduct
Did not appear	The applicant was admitted but did not appear for the exam

Review of the rating system of assessment during the semester
The RSO may be reviewed upon a reasoned request from the applicant studying the OK, the student self-government body or the student trade union committee, submitted to the head of the supporting department. The review procedure is defined in Section 7 of the Regulations on the System of Assessment of Learning Outcomes at Igor Sikorsky KPI https://osvita.kpi.ua/sites/default/files/downloads/Pologennia_RSO_2025.pdf

9. Additional information on the discipline (educational component)

Appendix 1. List of questions for the test in the discipline "Social Network Analysis"

1. The role of network analysis in social and behavioural sciences.
2. Historical and theoretical foundations of social network analysis: empirical motivation, theoretical motivation, mathematical motivation.
3. Basic concepts of network analysis: network, nodes, connections,
4. Features of measuring and collecting network data.
5. Notation of social networks: graph theory notation, sociometric notation, algebraic notation.
6. Measuring network structure.

7. Measuring node characteristics.
8. Network models. Processes in networks.
9. Methods of small group analysis in social and behavioural sciences.
10. Sociometric survey.
11. Analysis of sociometric survey data. Group and individual indices.
12. Computer tools for social network research.
13. Network analysis and visualisation using Gephi
14. The R environment as a tool for social network analysis.
15. Modelling and analysis of networks in the NetLogo system.
16. Ucinet capabilities. Network analysis using Ucinet.
17. Sentiment analysis of tweets using Node XL.

Appendix 2. Informal education

Certificates of completion of distance and online courses on the subject of the discipline or individual course modules may be accepted. In particular, we recommend studying on the following educational platforms:

1) Data Camp: courses Introduction to R, Introduction to statistics with R, Statistics fundamentals s 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: Specialisation Computational Social Science (https://www.coursera.org/specializations/computational-social-science-ucdavis) and the course Network Dynamics of Social Behaviour (https://www.coursera.org/learn/networkdynamics)

Appendix 3. List of questions for the Modular control work "Social Network Analysis"

1. The concept of a social network and its main components.
2. Description of the main types of network graphs in graph theory.
3. Characterisation of network centrality and metrics for its measurement.
4. Definition of the concept of "interconnectivity" in social networks.
5. Identification and classification of communities in social networks.
6. Differences between structural and behavioural networks.
7. Description of NodeXL capabilities for social network analysis.
8. The process of importing data into NodeXL and creating a network graph.
9. Basic graph layout algorithms in Gephi and their application.
10. Analysis of connections between nodes in a network using Gephi.
11. Identifying types of connections in a social network.
12. Methods of network clustering in multidimensional analysis.
13. Methods of collecting data in social networks for research purposes.
14. Features of tweet analysis on the Twitter platform from the point of view of network analysis.
15. Testing hypotheses in network research.
16. Problems of data collection from open sources of social networks.
17. Advantages of using multidimensional methods for social network analysis.
18. Using APIs to collect data on social networks.

Distance learning

Synchronous distance learning is possible using video conferencing platforms and the university's distance learning educational platform.

Inclusive learning

Permitted

The working programme 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 of 24 May 2024)

Approved by the Methodological Commission of the Faculty of Sociology and Law (Minutes No. 9 dated 26 June 2024)