



FACULTY OF SOCIAL SCIENCES

Introduction to Network Analysis
(*Baccalaureate Program, Political Science*)

Professor: Valentina (Valya) Kuskova
Office: Myasnitskaya, 20, office 231
Office Hours: Fridays, 16:30-18:00 or by appointment
Email: vkuskova@hse.ru

Class Hours: Lectures, Fridays (see schedule, there is a break in classes for two weeks during the semester) 12:10, Room 320a on M9/11; Seminars follow lectures and vary by group.

Text & Materials

1. Required readings:

- (1) Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications* (Vol. 8). Cambridge university press. (Provided)
- (2) Robert A. Hanneman and Mark Riddle. 2005. *Introduction to Social Network Methods* (online book) <http://www.faculty.ucr.edu/~hanneman/nettext/index.html>

2. There are some additional readings that you are responsible for throughout the semester. Whenever possible without violation of copyright laws, I will put provide you with a printed or electronic copy. In some instances, I will ask you to download the article from the HSE online library. Most of articles we'll be reading are available in the PDF format, and you can either print them yourselves, or read on-screen. The full bibliography of the additional readings that you have to download from the library will be provided when the need arises.

3. Software: you will be required to learn R. We will start from scratch with a crash course in R, and additional assignments throughout the semester will help you master the software.

I. Course Summary

This course is an introductory course in network analysis, designed to familiarize undergraduate students with the general concepts and basic techniques of network analysis in sociological research, gain general knowledge of major theoretical concepts and methodological techniques used in social network analysis, and get some hands-on experience of collecting, analyzing, and mapping network data with SNA software.

II. Course Description

This course is about networks. It will introduce students to the foundations of theory and methods of social network analysis (SNA), and to demonstrate how networks are used to explain and predict phenomena in a wide range of other applied disciplines. Specifically, we will focus on special tools for studying relationships and connections between people, groups, organizations, and countries in our increasingly connected world. For example, we may use SNA to study the role networks play in job searches and business relations, in diffusing knowledge through webs of doctors, in providing support in time of need, in giving rise to biotech industry, or in supporting criminal activities. SNA is an effective

way to examine cliques of friends in high schools, power networks of the business elites, as well as the intricate patterns of international trade.

An important part of this course is to demonstrate how network tools can be embedded with other research tools to study existing research ideas. Therefore, it contains three independent, but interconnected components:

1. Theoretical: network theory and theory of networks, and their role in nomological network of focal constructs of interest;
2. Methodological: methods of analysis and software programs used to analyze network data;
3. Applied: the theory and instruments learned in class are then used in individual and group work to design a research project in student's own area of interest.

The main goal of the class is to help students who have never worked with network theory and methods, to use the integrated systems thinking approach to create theoretically driven, methodologically sound research projects. The ultimate outcome of the class is the solid theoretical and instrumental foundation for later inclusion of network concepts in research projects.

Course Overview & Objectives

The goal of the course is ensure that students understand topics and principles of network analysis. Therefore, the course is designed:

- To provide students with an understanding of the basic principles of network analysis and lay the foundation for future learning in the area.
- To explore the advantages and disadvantages of various network analytic tools and methods, and demonstrate how they relate to other methods of analysis.
- To develop student familiarity, through hands-on experience, with the major network modeling programs, so that they can use them and interpret their output.
- To develop and/or foster critical reviewing skills of published empirical research using network analytic methods.

The Course develops the following competencies

Competencies	NC/NRU-HSE Code	Descriptors - the learning outcomes (the indicators of achievement)	Teaching forms and methods of that contribute to the development of a competence
<u>Systemic Competencies</u>			
1. Ability to work with complex data and use methods of network analysis and statistics appropriately.	CK-M2	Correctly selects appropriate model / method of network analysis for a given problem.	Lectures, readings, in-class exercises, data analysis projects
2. Ability to translate conceptual thinking into publishable quality papers	CK-M6	Confidently uses available data to test proposed hypotheses. Able to develop a solid theoretical foundation for the project at	Lectures, readings, in-class exercises, data analysis projects

Competencies	NC/NRU-HSE Code	Descriptors - the learning outcomes (the indicators of achievement)	Teaching forms and methods of that contribute to the development of a competence
3. Ability to advance own knowledge in the area of network research methods.	CK-M3	hand. Able to integrate information found from various sources and compensate for lack of data by adjusting models. Masters advanced research methods, including network methods, without direct supervision, and is capable of using these methods to analyze complex models.	Lectures; independent work.
4. Ability to reflect on learned network research methods and tools	CK-M1	Processes learned information, and is capable of integrating learned material into a cohesive research toolchest	Lectures; independent work.
<u>Instrumental Competencies</u>			
1. Ability to conduct written and oral communication in English to convey research ideas	ИК- M2.1/2.1/2	Concisely and precisely expresses research ideas in English in written and oral communication	Lectures, readings, in-class exercises, data analysis projects
2. Ability to conduct written and oral communication in English language to convey professional and scientific ideas	ИК- M2.1/2. 2.4. 1	Concisely and precisely expresses research ideas in English in written and oral communication	Lectures, readings, in-class exercises, data analysis projects
3. Ability to present and defend a scientific argument in front of a wide audience	ИК- M2.5.2_3.1 /2	Effectively presents research ideas to peers, instructors, and general audience	Lectures, readings, in-class exercises, data analysis projects

This course will emphasize advance preparation for each class period and will involve a high level of class participation. Often, experiential exercises and simulations will be used to illustrate key network analysis concepts. While I do not take attendance, missing classes on a regular basis will be detrimental to your learning.

Teaching Format

This is an interactive, participatory course. The course will be run mainly as a combination of lectures, small group discussions, and in-class exercises. In order to have good discussions of the course materials, students must come prepared for class. This means having **read the assigned reading materials before class and coming prepared to discuss the readings and ask questions.**

Lectures

Lectures are an integral part of this course, and they consist of two parts: the material I present in class and a slide deck with many more details (which we do not have time to go over in class). The slide deck, in many cases, is almost sufficient for you to master the material. In other words, if you read and understand *everything* in the slide deck, the assigned reading will only solidify the material further, but may not be required to do well in class. If you have issues with what is written in the slide deck, then the assigned reading material is essential – you must read and go through every minute detail, or you are highly unlikely to succeed.

III. Requirements and Evaluation Criteria

Grades

Course grades will be computed as follows:

Course Element	% Towards Final Grade
Final Project	50%
<i>Individual project work</i>	<i>50%</i>
Participation and responsibility grade	50%
<i>Homework Assignments (6 x Varied points)</i>	<i>20%</i>
<i>In-Class Labs (11-12 x Varied points)</i>	<i>20%</i>
<i>Quizzes (Best 11 of 12, Varied points)</i>	<i>10%</i>
Extra credit	As assigned
Total	100%

Grading Scale, Rounding, and Curves:

Your grade is the grade you *earn*. There is no curve imposed in this class.

I prefer to hear your concerns about grading during the semester. **Do not wait until the end of the semester to see me regarding problems with course materials or your performance (it will be too late to address deficiencies at the end of the semester).** If you are aware that you must achieve a particular grade in this course, please see me during the first week of the course. This will allow me to alert you of deficiencies in your performance. There is nothing that either of us can do at the end of the course.

Extra-credit: I firmly believe that education does not start and end with the required course material. Very often, what you remember the most from the course does not come from a book, but perhaps from a wise comment by a peer, a clever exercise, or an article you've read in Wall Street Journal because you related it to the course you were taking, but would have missed otherwise. I encourage students to learn things outside of class. I will sometimes point you to the facts or readings that I find interesting, and may ask you to write a page or two, or lead a discussion on such a topic. Because these topics often come up after the grading system has been announced and we are well into the semester, I will assign extra-credit points to them. A few things need to be noted:

- You *do not need* extra credit to do well in this class. Please do not feel obligated to turn in extra-credit assignments you are not interested in doing.

- Extra-credit assignments are due on their due date, and cannot be made up for ANY reason (including university-approved absences).
- DO NOT ask me for extra-credit assignments at the end of the semester if you are a few points short of your desired grade. Take care of any potential shortfalls when the opportunities are provided.
- Extra-credit opportunities will be offered to everyone. No individual extra-credit assignments will be offered or provided for any reason.

Projects

There will be a comprehensive take-home project, which allows you to demonstrate everything you've learned in class.

Exam is take-home, open-everything, INDIVIDUAL effort. When working on your project, you may consult any **published** source, including online materials. You may not, however, consult a live body other than myself. Such consultations also include chat room discussions while you are working on your exam, or posting questions on forums for someone else to answer. I am using www.turnitin.com and the HSE "antiplagiat" system to check submitted work for references to outside sources; chat room discussions, with date stamps, are usually the first to come up in my search. Violation of the above rules will lead to academic misconduct sanctions, so let's not even go there.

Project submission date is fixed; deadline for submission is firm and cannot be extended. Please see me well enough in advance if you anticipate that you need to make special arrangements for the change of the submission date for any reason.

Homeworks

In this class, homeworks are essential for learning. Simply put, you CANNOT learn statistics by simply attending the class. Homeworks will be more along the lines of the real-life problems that you will have to solve in the future, and you will have a week after the topic was introduced in class to work on these. Homework assignments are handed out in class (during seminars) and will be available electronically. I strongly recommend that you do not wait until the due date to complete those, and work on the problems a few at a time throughout the assigned period.

Due dates for all homeworks are clearly stated in the syllabus. Late homeworks are not accepted for ANY REASON. All homeworks should be submitted to me via LMS.

Quizzes

You cannot meaningfully participate in the seminar if you have missed my lecture and did not do any reading. Therefore, to encourage you to prepare for seminars, every seminar will have a quiz on the lecture material and all assigned readings for the week. This includes the very first seminar, which will focus on Lecture 1 material. You are allowed to miss any one quiz (skip a seminar, not prepare, etc.) – in other words, I will count the best 11 out of 12 quizzes that we will have. If you submit all twelve, I will count best nine. All quizzes will be done online and submitted to me via SurveyMonkey (links will be given in class).

In-class Labs

There will be a lab assignment in almost every seminar, depending on our progress. Since we will be learning R, and learning quickly, you will need to devote a substantial time to it. Seminar labs should help you with this task. At the end of the lab, you will submit your completed assignment for the day (or as much as you were able to complete) to me via LMS.

Rounding and grade calculation

Your final class grade is your accumulated grade, with no exam at the end of the course. Grades earned as percentages will translate into point grades in 10% increments: 10% - 1 point. 20% - 2 points, etc. Grades will be assigned as whole grades only. Grade rounding follows the standard mathematical averaging rules: 34.9% is a 3: 34.99999% is a 3, and only 35.0% is a 4. I know 1/10 of a percent is not a big deal, but please do not ask me to “bump” your grade 1/10 of a percent; earn it instead.

IV. Tips for Success and Other Issues of Concern

Absences and Excuses

You are responsible for attending class. If you miss class, you are still responsible for everything covered in class, including announcements. Absences excuse you (the body) **NOT ANY WORK THAT IS DUE, even if excuse is documented.** Failure to turn in assignments on time will result in a loss of participation/responsibility points, and a zero on the assignment. Similarly, being absent does not excuse you from obtaining handouts and assignments that you may have missed. It is your responsibility to find out what you have missed and to make arrangements to obtain any handouts, assignments, etc. All work is due as stated in the course schedule. **Exception: religious observance absences as stated below.**

Religious Observance: In keeping with university policy, accommodations will be made for observance of religious holidays. I require that you request accommodations in advance by notifying me in writing.

Class preparation

Considering that class preparation is a personal matter, and that there is no one formula, the following are some generally recommended guidelines for most cases:

1. Read the assigned material quickly, noting the major issues and a general sense of the layout. Read to get a sense of what the chapter is about. Ask yourself how you can relate to the materials covered, and whether all the new terms make sense.
2. Reread the material carefully, annotating, highlighting and distinguishing important information, omissions, and questions raised by the reading.
3. Decide what the most important issues are. Write down questions you don't understand.
4. Discuss the chapter with others, before class if possible, to test out your ideas and further your understanding of the issues.
5. Prepare notes to guide your class participation, including: answering assigned questions, summary of the main issue(s), further questions raised by the reading, assumptions made by the chapter, your personal experiences, and possible approaches or solutions to any problems assigned with the chapter.
6. **DO YOUR HOMEWORK and ATTEND SEMINARS TO COMPLETE LABS.**

Virtual Office Hours – LMS Forum

This is a very large class, and I may not be able to answer all questions that are e-mailed to me on a timely basis. Moreover, I've found over the years that usually 90% of all questions from students are nearly identical – that is, if you do not understand something, chances are, most other people do not, either. Instead of repeating answers over and over via email, I will be answering all content-related questions in LMS forum (it is already open for the class, please feel free to start threads and ask questions).

Feel free to answer questions posted on the Forum. Not only that will provide an answer to your peers quicker (I may not be able to respond to Forum questions immediately), but I will also monitor your Forum activities and will provide **extra-credit** to the most active students who provide best answers.

Messages and Memos for Me

If you have any messages or specific requests for me, please submit them by e-mail or in typed format. Ensure that your message includes your name, a complete description of your concern, and a recommendation for resolution. Please note that I have a very busy inbox; usually, I answer emails only once a day, very early in the morning. So if you send me a question around 10 am, please do not expect to receive answer until the following day.

Stay Informed about Class Schedules & Policies

It is the student's responsibility to stay informed about class schedules and policies. The information you need is included on both the paper copy of the syllabus, and the online website pages. In addition, announcements will be made regularly in class and on website, and it is your responsibility to keep up with that information. If you are unclear about any policies or other information, please ask promptly. Don't wait and get an unpleasant surprise later.

Participation Ground Rules

In an effort to provide a classroom environment as conducive to learning as possible, the following ground rules should be observed:

1. *Confidentiality.* Concepts and ideas can be taken from the class and discussed freely. However, personal stories or issues raised by individuals are to be kept confidential and as the property of the class.
2. *Respectful Listening.* When differing with another participant's point of view, listen first before raising questions. When another participant raises a point we disagree with or find offensive, it is important to remember that the human being behind that question or comment deserves respect. Please freely utilize the concepts we'll learn in the second week of class.
3. *Participation.* Participants who tend to be quieter are encouraged to contribute to enhancing the learning process by sharing their perspectives and experiences. Those who are aware they are prone to monopolizing discussions are encouraged to self-monitor their behavior and make room for quieter students.
4. *No Zaps.* In keeping with the notion of respectful listening, "putting-down" others in class is discouraged. "Zapping" another person often serves to discourage open and honest exchange of ideas among the whole group.

Academic Honesty

Scholastic dishonesty, including cheating in exams or plagiarism, will be treated as a violation of university's regulations. As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the most severe forms of academic dishonesty and can be expected to result in appropriate consequences.

You must complete exams and assignments alone, except group exercises. You may use only the materials I specify to help you complete your work. If, due to a disability or extraordinary circumstances, you need special accommodations or help in completing course requirements, you must see the instructor BEFORE the exam or assignment due date.

Personally, I have no tolerance for cheating, regardless of the reason. **Simply put, don't do it.**

Copyright Notice

All handouts in this course are copyrighted, including all materials posted on the website for this course. “Handouts” refers to all materials generated for this class, which include but are not limited to the syllabus, class notes, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. You have the right to download materials from the course website for your own use during this class; however, because these materials are copyrighted, you do not have the right to copy the handouts for other purposes unless the instructor expressly grants permission.

Good luck and have fun!

V. Class Schedule

(Subject to change with advance notice)

Date	Topics and Events	Readings	Assignments
Week 1	Social network analysis: Methods or theory? Structural approach. Interdisciplinary interest in network analysis. Network theories most popular in sociology. Key network concepts: network, structure, nodes, ties, sociogram, structural and compositional variables, etc. Types of network data. Sampling and data collection in network analysis.	Hanneman & Riddle, Ch. 1-4; Wasserman & Faust, Ch. 1-2	Quiz 1 during Seminar Crash course in R
Week 2	Survey instruments for collecting network data. Network data collection and ethical issues. Basic measures of network characteristics. Graphic representation of network relations.	Hanneman & Riddle, Ch. 5-7, 16; Wasserman & Faust, Ch. 3-4	Quiz 2 during Seminar Homework 1 due
Week 3	Network measures for dyads and triads. The forbidden triad. Clustering. Identifying tightly connected groups and subgroups in social networks. Small-world phenomenon. Homophily principal in personal relationships. Cultural and historical differences in network connectivity. Personal ties and social support.	Hanneman & Riddle, Ch. 8, 11; Wasserman & Faust, Ch. 13-14.	Quiz 3 During Seminar
Week 4	Centrality and Influence. Measures of Centrality. Two-mode networks: transformation, graphical representation, and analysis. Centrality and two-mode networks in the studies of power and influence.	Hanneman & Riddle, Ch. 5-6; Wasserman & Faust, Ch. 5	Quiz 4 During Seminar Homework 2 Due
Week 5	The strength of weak ties. Social capital at the individuals and community level.	Wasserman & Faust, Ch.	Quiz 5 During Seminar

	Social capital in companies' economic activities. Social capital in the labor market and its role in social mobility. Structural holes in competition.	12. Handouts	
Week 6	Social networks and education. Representation of mental models as social networks. Diffusion of innovation through social networks. Social networks and technology. Deviant behavior, crime and social networks. Social stratification, social change, and social networks	Handouts	Quiz 6 During Seminar Homework 3 due
Week 7	Network models (TBD)	Handouts	Quiz 7 During Seminar
Week 8	Network models (TBD)	Handouts	Quiz 8 During Seminar Homework 4 due
Week 9	Network models (TBD)	Handouts	Quiz 9 During Seminar
Week 10	Network models (TBD)	Handouts	Quiz 10 During Seminar Homework 5 due
Week 11	Network models (TBD)	Handouts	Quiz 11 During seminar
Week 12	Network models (TBD)	Handouts	Quiz 12 during seminar Homework 6 due
Take-home Final Project Due TBD			