

**Санкт-Петербургский филиал федерального государственного  
автономного образовательного учреждения высшего образования  
"Национальный исследовательский университет  
"Высшая школа экономики"**

Факультет Санкт-Петербургская школа  
социальных и гуманитарных наук Национального исследовательского  
университета «Высшая школа экономики»

Департамент социологии

**Рабочая программа дисциплины  
*Информационные системы (преподается на английском языке)***

для образовательной программы «Социология и социальная информатика»  
направления подготовки 39.03.01 «Социология»  
уровень бакалавриат

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Согласована методистом ОСУП

«30» августа 2016 г.

Т.Г. Ефимова \_\_\_\_\_

Утверждена Академическим советом образовательной программы

«30» августа 2016 г., № протокола \_\_\_\_\_ 1 \_\_\_\_\_

Академический руководитель образовательной программы

Д.А. Александров \_\_\_\_\_

Санкт-Петербург, 2016

*Настоящая программа не может быть использована другими подразделениями университета и другими вузами без разрешения кафедры-разработчика программы.*

## Оглавление

|   |    |
|---|----|
| Информационные системы (преподается на английском языке) – для студентов 1-го курса | 3  |
| Информационные системы (преподается на английском языке) – для студентов 2-го курса | 17 |
| Информационные системы (преподается на английском языке) – для студентов 3-го курса | 25 |

## Аннотация

|  |  |                        |       |
|--|--|------------------------|-------|
| Название дисциплины  | <b>Информационные системы (преподается на английском языке) – для студентов 1-го курса</b>   |                        |       |
| Образовательная программа  | Бакалаврская программа «Социология и социальная информатика»   |                        |       |
| Тип дисциплины   | Обязательная   |                        |       |
| Требования к уровню знаний студентов, необходимых для освоения дисциплины (пререквизиты) | Нет  |                        |       |
| Объем з.е.   | 4  |                        |       |
| Объем в часах  | Аудиторная работа  | Самостоятельная работа | Всего |
|  | 60   | 92                     | 152   |
| Краткое описание курса   | <p>Курс рассматривает основные концепции технологий баз и обработки данных, бизнес процессов и организационного анализа. Студенты узнают о различных типах информационных систем (ИС) и основных направлениях в создании дизайна ИС, включающем обработку данных, процесс принятия решений и анализ операционных издержек. Студенты изучат социальную природу проектирования и разработки ИС, а также поймут, как подходы из социальных наук и методология исследований могут улучшить данные процессы. С социотехнической точки зрения мы обсудим концепции мобильных технологий, облачных вычислений, больших данных, социальных медиа и их влияние на настоящее и будущее ИС. Помимо этого, в рамках курса будут рассмотрены коллаборативные системы на различных уровнях: от обмена документами и информацией в небольших группах до всемирной паутины</p> |                        |       |
| Образовательные результаты по дисциплине   | <p>В результате курса студенты:</p> <ul style="list-style-type: none"> <li>● будут знать различные типы информационных систем и основные подходы к анализу организаций с информационной точки зрения;</li> <li>● смогут проектировать простые бизнес-процессы с учетом потребностей клиентов и организаций;</li> <li>● смогут строить базовые аналитические отчеты, используя Tableau;</li> <li>● сможет описывать организационные цели различных сервисов и моделировать возможные взаимодействия между сервисными системами и клиентами;</li> <li>● будут знать основные принципы программирования в рамках работы с библиотекой Ren'Py для языка программирования Python.</li> </ul>  |                        |       |

| Краткое содержание дисциплины |   |       |                   |                      |                        |
|-------------------------------|---|-------|-------------------|----------------------|------------------------|
| №                             | Раздел курса  | Всего | Аудиторная работа |                      | Самостоятельная работа |
|                               |   |       | Семинары          | Практические занятия |                        |
| 1                             | Бизнес-аналитика и обработка данных   | 34    | 8                 | 8                    | 18                     |
| 2                             | Информационные системы и бизнес-процессы  | 26    | 4                 | 8                    | 14                     |
| 3                             | Веб-сервисы и социальный компьютинг   | 58    | 10                | 20                   | 28                     |
| 4                             | Проекты   | 34    | 2                 | 0                    | 32                     |
| <b>Всего часов</b>            |   | 152   | 24                | 36                   | 92                     |
| Образовательные технологии    | Методы преподавания и обучения включают практические занятия с компьютером, семинары, групповые проектные работы и домашние задания.  |       |                   |                      |                        |
| Формы контроля                | <p>Стратегия оценки разработана таким образом, чтобы охватить как практические навыки, так и командную работу в рамках групповых проектов, а теоретические знания - в 2 письменных тестовых работах. Накопленная оценка состоит из:</p> <ul style="list-style-type: none"> <li>● Групповой проект (2 модуль) – 25% от накопительной оценки</li> <li>● Тест (2 модуль) – 25% от накопительной оценки</li> <li>● Групповой проект (3 модуль) – 25% от накопительной оценки</li> <li>● Тест (3 модуль) – 25% от накопительной оценки</li> <li>● Экзамен (3 модуль) – 40% от итоговой оценки</li> </ul> <p>Округление итоговой оценки: в пользу студента.</p>   |       |                   |                      |                        |
| Литература                    | <p><u>Основная</u></p> <ol style="list-style-type: none"> <li>1. Olson, David. Information Systems Project Management. New York: Business Expert Press, 2014. <a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=1908997">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=1908997</a></li> <li>2. Vanderjack, Brian. The Agile Edge : Managing Projects Effectively Using Agile Scrum. New York: Business Expert Press, 2015. <a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=2145193">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=2145193</a></li> <li>3. Milligan, Joshua N.. Learning Tableau. Olton Birmingham: Packt Publishing Ltd, 2015. <a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=2037694">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=2037694</a></li> </ol> <p><u>Дополнительная</u></p> <ol style="list-style-type: none"> <li>1. Murray, Daniel G.. Tableau Your Data! : Fast and Easy Visual Analysis with Tableau Software. Hoboken: John Wiley &amp; Sons, Incorporated, 2016. <a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4334741">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4334741</a></li> <li>2. Fichman, Pnina, and Rosenbaum, Howard, eds. Social Informatics :</li> </ol> |       |                   |                      |                        |

|               |   |
|---------------|---|
|               | Past, Present and Future. Newcastle-upon-Tyne: Cambridge Scholars Publishing, 2014. <a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=1656497">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=1656497</a> |
| Преподаватель | Мусабилов И.Л., Воскресенский В.М.  |

## Course Syllabus

|                                     |   |                     |       |
|-------------------------------------|---|---------------------|-------|
| Title of the course                 | <b>Information Systems (offered in English) (for the 1st year students)</b>   |                     |       |
| Title of the Academic Programme     | Bachelor's Programme 'Sociology and Social Informatics'   |                     |       |
| Type of the course                  | Obligatory  |                     |       |
| Prerequisites                       | None  |                     |       |
| ECTS workload                       | 4   |                     |       |
| Total indicative study hours        | Directed Study  | Self-directed study | Total |
|                                     | 60  | 92                  | 152   |
| Course Overview                     | <p>This course studies the interconnections of technology, people, and business in organizations implemented as information systems. Starting from the basics of Information Technology, we will discuss how organizations use contemporary IT toolkit to achieve their goals. The course will introduce students to the concepts of business processes, social computing, business analytics, organizational analysis. We will study different types of information systems and major approaches to their design in alignment with organizational goals, including data processing, decision making and transaction costs aspects. We will uncover the strong social nature of IS planning, design, and development processes and how social science theory and methods can enrich these processes. We will study different types of IS for different audiences, including business information systems and information systems in science and research. From a sociotechnical point of view, we will discuss mobile technologies, cloud computing, Big Data, social media, and how they influence the present and the future of information systems. Then the course will move to collaborative systems of different levels – from small group document sharing to the World Wide Web, and their design principles.</p> |                     |       |
| Intended Learning Outcomes (ILO)    | <p>As a result of this course, students:</p> <ul style="list-style-type: none"> <li>● will know different types of information systems and main approaches to analyzing organizations from an information perspective;</li> <li>● will be able to design simple business processes paying attention to the needs of customers and organizations;</li> <li>● will be able to construct basic analytical reports using Tableau;</li> <li>● will be able to describe organizational goals of different services and model possible interactions between service systems and clients;</li> <li>● will know basic principles of programming in the framework of working with Ren'Py library for Python.</li> </ul>   |                     |       |
| Teaching and Learning Methods       | Teaching and learning methods include tutorials, seminars, group work, home assignments.  |                     |       |
| Content and Structure of the Course |   |                     |       |

| №  | Topic / Course Chapter                     | Total  | Directed Study |              | Self-directed Study |
|--|--|--|----------------|--------------|---------------------|
|  |  |  | Seminars       | Tutorials    |                     |
| 1  | Business Analytics and Data Processing     | 34   | 8              | 8            | 18                  |
| 2  | Information Systems and Business Processes | 26   | 4              | 8            | 14                  |
| 3  | Web Services and Social Computing          | 58   | 10             | 20           | 28                  |
| 4  | Project                                    | 34   | 2              | 0            | 32                  |
| <b>Total study hours</b>                   |  | <b>152</b>   | <b>24</b>      | <b>36</b>    | <b>92</b>           |
| Indicative Assessment Methods and Strategy |  | <p>Assessment strategy is designed to cover both practical skills and teamwork via group projects and theoretical knowledge via 2 tests.</p> <ul style="list-style-type: none"> <li>● Group project (module 2) – 25% of the cumulative grade</li> <li>● Test I (module 2) – 25% of the cumulative grade</li> <li>● Group project (module 3) – 25% of the cumulative grade</li> <li>● Test II (module 3) – 25% of the cumulative grade</li> <li>● Exam (module 3) – 40% of the final grade</li> </ul> <p>The exam grade is rounded arithmetically.<br/>The final grade is rounded in favor of the student.</p>  |                |              |                     |
| Readings / Indicative Learning Resources   |  | <p><u>Mandatory</u></p> <ol style="list-style-type: none"> <li>1. Olson, David. Information Systems Project Management. New York: Business Expert Press, 2014. <a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=1908997">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=1908997</a></li> <li>2. Vanderjack, Brian. The Agile Edge : Managing Projects Effectively Using Agile Scrum. New York: Business Expert Press, 2015. <a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=2145193">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=2145193</a></li> <li>3. Milligan, Joshua N.. Learning Tableau. Olton Birmingham: Packt Publishing Ltd, 2015. <a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=2037694">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=2037694</a></li> </ol> <p><u>Optional</u></p> <ol style="list-style-type: none"> <li>3. Murray, Daniel G.. Tableau Your Data! : Fast and Easy Visual Analysis with Tableau Software. Hoboken: John Wiley &amp; Sons, Incorporated, 2016. <a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4334741">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4334741</a></li> <li>4. Fichman, Pnina, and Rosenbaum, Howard, eds. Social Informatics : Past, Present and Future. Newcastle-upon-Tyne: Cambridge Scholars Publishing, 2014. <a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=1656497">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=1656497</a></li> </ol> |                |              |                     |
| Indicative Self- Study Strategies          |  | <b>Type</b>  | <b>+/-</b>     | <b>Hours</b> |                     |
|  |  | Reading for seminars / tutorials (lecture materials, mandatory and optional resources)   | +              | 20           |                     |

|                                    |   |   |    |
|------------------------------------|---|---|----|
|                                    | Assignments for seminars / tutorials / labs                         | + | 20 |
|                                    | E-learning / distance learning (MOOC / LMS)                         | - |    |
|                                    | Fieldwork   | - |    |
|                                    | Project work  | + | 30 |
|                                    | Other (please specify)  | - |    |
|                                    | Preparation for the exam  | + | 22 |
| Academic Support for the Course    | Academic support for the course is provided via e-mail and dropbox. |   |    |
| Facilities, Equipment and Software | Computer class, projector, Python, Tableau, MS Office               |   |    |
| Course Instructor                  | Sr. Lecturer Ilya Musabirov, Vadim Voskresenskiy MA                 |   |    |

## Annex 1

### Course Content

#### Topic 1 - Business Analytics and Data Processing:

##### 1) Introduction to Information Systems

What information is; How it is connected with data; Why do we need them; What is data science; the Basic process of the problem solving

##### 2) Introduction to Excel

Why Excel (Spreadsheets) is an important tool; Basic functions for the analysis in Excel; Making reports using Microsoft Word

##### 3) Principles of working with data

Sources where data can be found; Introduction to different data formats

##### 4) Advanced analysis in Excel

Logic functions; Manipulation with the data; Pivot tables

##### 5) Working with text data in Excel

Specificity of text data; Applying functions to texts

##### 6) Information Systems in Business

History of Information Systems; Basic principles of Business Analytics; Particular business cases from the industry

##### 7) Individual work

Recap of the covered material

##### 8) Introduction to Tableau

Why Tableau is an important tool; Tableau interface; Types of data; Specificity of working with different data types in Tableau; Basic principles of data visualization; Acquaintance with different types of plots

##### 9) Stating and refining of the Research Question

What research question is; Why it is needed for the project success; Types of research questions; How to make a good research question

10) Basic analysis in Tableau

Data aggregation; Centrality measures (mean, median and mode); Types of plots

11) Creating dashboards

What dashboard is; Where dashboard can be useful; Principles and aims of the dashboard; Implication to business cases

12) Analytical graphics

Principles of analytical graphics; Types of dashboards; Characteristics of a Well-Designed Dashboard; UI Checklist for Dashboard Design

13) Geographical data

When geographical data is necessary for the analysis; History of creating maps; Maps in science and business; Creating maps in Tableau

14) Advanced analysis in Tableau

Connecting databases; Types of joins; Data filtration; Making calculations within Tableau using different data types

15) Test (module 2)

**Topic 2 - Information Systems and Business Processes:**

16) Key Performance Indicators

What KPI is; Where it can be implemented; KPI types; Examples of KPI in different professional spheres

17) Agile analytics

Basic principles of business analytics; User eXperience; System Analytics; Requirements engineering; Agile

18) Individual work

Recap of the covered material

19) Communication and principles of teamwork

Building teams; Basic software development principles; Distribution of duties within the team; Sufficient communication

20) Introduction to RenPy

What RenPy is; Why do we need it; What visual novel is; How it can be implemented in the process of problem-solving

**Topic 3 - Web Services and Social Computing:**

21) Introduction to distributed groups

What distributed group is; Working with business software; Organizing the working process; Documenting design decision

22) Basic programming with RenPy

Logic functions (if, elif, else); Lists; Setting new variables; Changing values in variables

23) Successful distributed groups

Characteristics of successful distributed groups; Distributed groups in the industry

24) Advanced programming with RenPy  
Imagemap; GUI

25) Test (module 3)

26) Advanced programming with RenPy  
Vocabularies; Probabilities as a visual novel element; Chances

27) Social Computing  
Principles of social computing; Background of the concept; Implementation in industry and business and specific examples

28) Discussion of RenPy projects  
Recap of the covered material; Consultation

## Annex 2

### Assessment Methods and Criteria

#### Assessment Methods

| Types of Assessment  | Forms of Assessment | Modules |   |   |   |
|----------------------|---------------------|---------|---|---|---|
|                      |                     | 1       | 2 | 3 | 4 |
| Formative Assessment | Test                |         | * | * |   |
|                      | Project             |         | * | * |   |
| Summative Assessment | Exam                |         |   | * |   |

#### Assessment Criteria

##### Project Work - Module 2 - Tableau

The main outcome of the project should be the dashboard correctly designed to satisfy the needs of a particular employee, involved in the decision-making process.

1. Divide into small groups. 2-3 persons in each.
2. Choose one of the provided public data sets.

Example of the dataset: <https://www.kaggle.com/uciml/student-alcohol-consumption>

Hint: Some categorical variables might be identified by Tableau as numeric, which might cause some troubles with correctly visualizing them.

3. Firstly, think about the possible job positions in any type of company or organization, which might be interested in the data that you have. Choose one of them. Then answer the questions below and describe the purpose of your dashboard (750+ words).
  - 3.1. Who will be the primary user of your dashboard?
  - 3.2. What are the job responsibilities of the employee you choose?

- 3.3. Why he or she might be interested in the information that your dashboard shows? What is the objective of your dashboard? How it might help them in decision making? Write a few particular examples (at least 2) of solutions/decisions, which might be made based on your visualizations.
- 3.4. Please, describe the design of your dash. What graphics should be used? How the charts should be connected? Do you have primary and dependent or supporting charts?
- 3.5. List top-5 KPIs that are useful for those who will use your dashboard. Which of them might be implemented in your dashboard? Suggest at least one KPI by yourself.
- 3.6. What is the absent data which might significantly improve your dashboard? How it might be useful?
4. Create a dashboard, that you described, in Tableau. Requirements for the dashboard:
  - 4.1. Dashboard ideally should be concerned with one topic.
  - 4.2. The dashboard and all the charts included in the dashboard must have titles and understandable axis titles.
  - 4.3. If the chart is meaningless and does not give any useful information to a person who works with the dashboard, this chart should not be included to the dashboard.
  - 4.4. The Overall rule is that dashboard should be easy to use and to interpret the results.
5. Submit your work!
  - 5.1. Publish your dashboard to Tableau Public
  - 5.2. Add the link to the dashboard to the text document

| Grades             | Assessment Criteria  |
|--------------------|--|
| «Excellent» (8-10) | <p>In addition to criteria, described for the “Satisfactory” and “Good” grades.<br/>Text includes:</p> <ol style="list-style-type: none"> <li>(1) list of KPIs that are useful for the target audience of the dashboard;</li> <li>(2) description of the absent data which might significantly improve the dashboard.</li> </ol> <p>Dashboard:</p> <ol style="list-style-type: none"> <li>(1) all of the visualizations in dashboard use scales of color/shape/size, which are appropriate for coded data.</li> </ol> <p>Additional points are awarded for:</p> <ol style="list-style-type: none"> <li>(2) the dashboard includes text descriptions with main findings;</li> <li>(3) dashboard has tools for data filtering;</li> <li>(4) dashboard has an integration of interactivity between visualizations (e.g. data selection/highlighting);</li> <li>(5) the dashboard includes any visualizations or features not discussed in the classes.</li> </ol> |
| «Good» (6-7)       | <p>In addition to criterias, described for the “Satisfactory” grade.<br/>Text should include:</p> <ol style="list-style-type: none"> <li>(1) the description of the dashboard design, where at least primary and dependent or supporting charts should be pointed;</li> <li>(2) particular examples (at least 2) of solutions/decisions, which might be made based on the dashboard.</li> </ol> <p>Dashboard:</p> <ol style="list-style-type: none"> <li>(1) Some of the visualizations might use scales of color/shape/size, which are inappropriate for coded data.</li> </ol>   |

|                      |  |
|----------------------|--|
|                      | (2) Axis of visualizations has user-defined titles.  |
| «Satisfactory» (4-5) | <p>Text description, which is concomitant to the analytical dashboard, includes:</p> <p>(1) definition of the target audience;<br/> (2) definition of primary needs and responsibilities of the target audience;<br/> (3) description of about why an audience might be interested in the information that the dashboard shows;<br/> (4) description of the main objective of the dashboard.</p> <p>The Dashboard should be built according to principles of analytical graphics and match the following criteria:</p> <p>(1) used visualizations (types of graphs) are appropriate to the data type;<br/> (2) the dashboard includes at least 2 visualizations;<br/> (3) all graphs have a title;<br/> (4) legend is created for all the graphs containing variables coded by color/shape/size/etc.</p> |
| «Fail» (0-3)         | Analytical dashboard or concomitant text is absent. Fails to demonstrate any appropriate knowledge.  |

### Project Work - Module 3 - Python (RenPy)

The Aim of the project is to create a game with the help of Python programming language, particularly, RenPy library.

1. Divide into small groups. 3-4 persons in each.
2. Come up with a small game on an interesting topic for you. This could be a quest, a replication of tv-show "who wants to be a millionaire" or a gamified navigator for the freshmen students of HSE University.
3. Make a list of all locations (scenes) in your game. Draw a scheme that will show all possible transitions between locations (scenes).
4. Make a list of all characters in your game. For each of them describe, if they have any attributes/characteristics and what type of variable (logic/integer/character/list/dictionary) it would be in RenPy.
5. Make a list of all variables, which might affect the flow of the game scenario, but not attached to any character.
6. Write your game in python with the help of RenPy framework. To get and excellent an grade your script should be launch and have to include:
  - 6.1. At least 5 scenes and 5 characters;
  - 6.2. At least 5 simple variables (store only one value);
  - 6.3. At least 2 complex variables (list/set/dictionary);
  - 6.4. Assignment of at least 2 variables include randomness
  - 6.5. At least 3 control flows elements;
  - 6.6. all scenes (locations) and characters have images.
7. Additional points are awarded for:
  - 7.1. Advanced design features (hotspots, edited images, an indication of the character's state by images);
  - 7.2. Integration of any external data sources (API, json, csv);
  - 7.3. Any other elements, which were not discussed in the class.

To submit your work, save your RenPy project to an archive, along with all description texts, and send us by e-mail.

| Grades               | Assessment Criteria  |
|----------------------|--|
| «Excellent» (8-10)   | <p>Script includes:</p> <ul style="list-style-type: none"> <li>(1) at least 5 scenes and 5 characters;</li> <li>(2) at least 5 simple variables (store only one value);</li> <li>(3) at least 2 complex variables (list/set/dictionary);</li> <li>(4) assignment of at least 2 variables include randomness</li> <li>(5) at least 3 control flows elements;</li> <li>(6) all scenes (locations) and characters have images.</li> </ul> <p>Additional points are awarded for:</p> <ul style="list-style-type: none"> <li>(1) advanced design features (hotspots, edited images, an indication of the character's state by images);</li> <li>(3) integration of any external data sources (API, json, csv);</li> <li>(2) any other elements, which were not discussed in the class.</li> </ul> |
| «Good» (6-7)         | <p>Script includes:</p> <ul style="list-style-type: none"> <li>(1) at least 3 scenes and 3 characters;</li> <li>(2) at least 3 simple variables (store only one value);</li> <li>(3) at least 1 complex variable (list/set/dictionary);</li> <li>(4) assignment of at least 1 variable include randomness;</li> <li>(5) at least 3 control flows elements;</li> <li>(6) all scenes (locations) and characters have images.</li> </ul>  |
| «Satisfactory» (4-5) | <p>Scripts include:</p> <ul style="list-style-type: none"> <li>(1) at least 2 scenes and 2 characters;</li> <li>(2) at least 2 simple variables (store only one value);</li> <li>(3) at least 2 control flows elements;</li> <li>(4) most of the scenes (locations) and characters in the script have images.</li> </ul>   |
| «Fail» (0-3)         | <p>RenPy project does not start and the script does not contain an appropriate amount of code.</p>   |

## Tests

Each test consists of 10 questions. Each test questions weights 1 point. Each open question weight equals the number of sub-items in the question. Up to 2 additional points might be awarded for excellent answers on the open questions.

### Example of Test I - Module 2

Q1: Which of the following is not a type of research question?

- A. Descriptive
- B. Sophisticated
- C. Exploratory
- D. Ideological

Q2: Which of the following is correct?

- A. Exploratory - allows making a conclusion about all population based on a sample
- B. Inferential - checks if there are patterns, trends, or relationships between variables
- C. Structuring - aimed to classify unstructured data into categories
- D. Descriptive - summarizes dataset characteristics

Q3: Which of the following characteristics are obligatory for a good research question?

- A. Interesting to your audience
- B. Can bring economic benefits
- C. Coordinated with an academic supervisor
- D. Specificity

Q4: Look at 2 research questions stated below. For each: (Open question)

Q4.1. What is the the most viewed category of videos on YouTube?

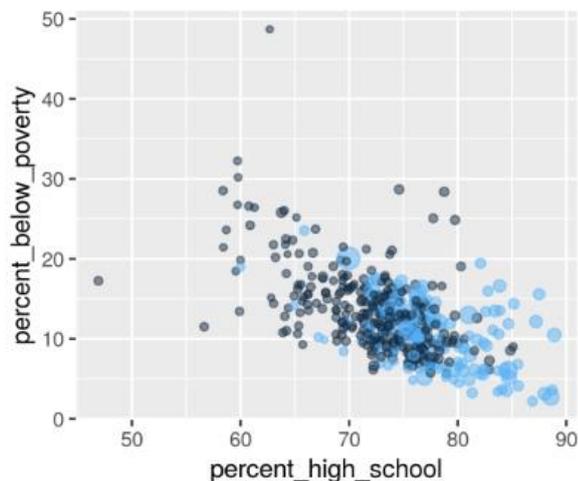
Q4.2. What is the most beautiful palace in France?

- Identify the type of each research question
- Determine whether a research question is good or bad
- Explain shortly what is wrong (if it is)
- Rephrase the question to make it better (if it's necessary)

Q5: Give an example of descriptive and predictive research questions, based on these dataset described below:

Imagine that you work for a company developing online games. The profit of your company depends on how much time players spend in the game. You have socio-demographic data about players, as well as the information about their actions in the game.

Q6: You are given a graph. What's wrong with it. What should be done to make it better? (Open question)



Q7: Which of the following characteristics are not necessary for a good graph?

- A. Show comparisons
- B. Multiple color pallet or gradient
- C. Title is underlined
- D. Show causality, mechanism, explanation, systematic structure

Q8: Choose correct answers. Iterations in Agile:

- A. Should have fixed length
- B. Might form a series which aggregates functionality for a release
- C. Should have fixed scope (number of user stories per iteration)
- D. Can contain only user stories written by Agile Master

Q9: A User Story in Agile connects:

- A. User role, activity/goal, business value/reward
- B. User, reward, punishment
- C. User role, problem, business task
- D. The Business problem, success criteria, the design decision

Q10: What is the main responsibility area of Product Owner in Agile? (Open question)

Example of Test II - Module 3

You have to describe a mashup for a particular target audience. For example you can take the mashup for cultural event journalists or a mashup for hitchhikers. You can make assumptions if you don't know whether the required service or source of data exists, but write your assumptions down and make them realistic.

Q1. What is the purpose of the mashup?

Q2. List at least 3 functions of the mashup.

Q3. Make a list of the services and data sources that the mashup will use.

Q4. What additional value it will provide to the users compared the to original services?

Q5. Are there any opportunities for scaling that mashup and expanding its' target audience?

What features will be required and by whom?

Imagine that we are working on building simulation. Its' aim is to model the situation of a passing an exam on physical culture in a university. The Simulation starts in a dormitory of a university in the day of the exam. Actor in this simulation is a student who needs to get to a university and pass the exam.

Q6. Come up with at least 3 characters, which should appear on that simulation.

Q6.1 Do they have any changeable attributes important for the simulation scenario?

Q6.1 What are their functional role in the simulation?

Q7. Give examples of 3 simple variables which can be used in the described situation in the process of modelling it in RenPy.

Q7.1 Which values it contains?

Q7.2 Why it's needed in the simulation.

Q8. Give examples of 3 compound variables (list, set and dictionary)

Q8.1 Which values it contains?

Q8.2 Why it's needed in the simulation.

Q8.3 Describe keys and values for your dictionary variable.

### Exam - Module 3

The Final test is a mix of question from the Tests I-II. It includes:

1. 2 test questions on stating research questions from the Test I
2. 2 test questions on Agile methodology from the Test I
3. 1 open question on stating research questions from Test I
4. 1 open question on Agile methodology from Test I
5. 1 open question on principles of analytical visualization from Test I
6. 1 open question on characters in simulation design in RenPy framework from Test II
7. 2 open question on variables in simulation design in RenPy framework from Test II

| Grades               | Assessment Criteria            |
|----------------------|--------------------------------|
| «Excellent» (8-10)   | 70% of points earned or more   |
| «Good» (6-7)         | 50% - 69% of points earned     |
| «Satisfactory» (4-5) | 30% - 49% of points earned     |
| «Fail» (0-3)         | Less than 30% of points earned |

### **Recommendations for students about the organization of self-study**

Self-study is organized in order to:

- Systemize theoretical knowledge;
- Extending theoretical knowledge;

- Learn how to use legal, regulatory, referential information and professional literature;
- Development of cognitive and soft skills: creativity and self-sufficiency;
- Enhancing critical thinking and personal development skills;
- Development of research skills;
- Obtaining skills of efficient independent professional activities.

Self-study, which is not included into a course syllabus, but aimed at extending knowledge about the subject, is up to the student's own initiative. A teacher recommends relevant resources for self-study, defines relevant methods for self-study and demonstrates students' past experiences. Tasks for self-study and its content can vary depending on the individual characteristics of a student. Self-study can be arranged individually or in groups both offline and online depending on the objectives, topics and difficulty degree. Assessment of self-study is made in the framework of teaching load for seminars or tests.

In order to show the outcomes of self-study it is recommended:

- Make a plan for 3-5 presentation which will include topic, how the self-study was organized, main conclusions and suggestions and its rationale and importance.
- Supply the presentation with illustrations. It should be defined by an actual task of the teacher.

### **Special conditions for the organization of learning process for students with special needs**

The following types of comprehension of learning information (including e-learning and distance learning) can be offered to students with disabilities (by their written request) in accordance with their individual psychophysical characteristics:

- 1) *for persons with vision disorders*: a printed text in the enlarged font; an electronic document; audios (transferring of learning materials into the audio); individual advising with assistance of a sign language interpreter; individual assignments and advising.
- 2) *for persons with hearing disorders*: a printed text; an electronic document; video materials with subtitles; an individual advising with assistance of a sign language interpreter; individual assignments and advising.
- 3) *for persons with muscle-skeleton disorders*: a printed text; an electronic document; audios; individual assignments and advising.

## Аннотация

| Название дисциплины  | <b>Информационные системы (преподается на английском языке) – для студентов 2-го курса</b>  |                        |                   |          |                      |                        |
|--|---|------------------------|-------------------|----------|----------------------|------------------------|
| Образовательная программа  | Бакалаврская программа «Социология и социальная информатика»  |                        |                   |          |                      |                        |
| Тип дисциплины   | Обязательная  |                        |                   |          |                      |                        |
| Требования к уровню знаний студентов, необходимых для освоения дисциплины (пререквизиты) | Информационные системы (1 курс), Теория аргументации и академическое письмо   |                        |                   |          |                      |                        |
| Объем з.е.   | 5   |                        |                   |          |                      |                        |
| Объем в часах  | Аудиторная работа   | Самостоятельная работа | Всего             |          |                      |                        |
|  | 40  | 150                    | 190               |          |                      |                        |
| Краткое описание курса   | <p>Цель курса – ознакомить студентов с процедурой работы в академических и новостных базах данных.</p> <p>В рамках курса студенты учатся применять информационные ресурсы и специализированное программное обеспечение для подготовки аналитических обзоров литературы (библиографические базы данных – Web of Science, Scopus) и обзоров материалов СМИ (новостные базы данных – Integrum, Factiva).</p> <p>Мы обсуждаем стратегии поиска информации и принципы организации литературных обзоров, в том числе практики цитирования.</p> <p>Значительная часть курса посвящена принципам работы с библиографическими базами данных: составление поискового запроса для сбора данных о цитировании, использование встроенных инструментов для аналитики научных тенденций, выгрузка из базы данных. Используя полученные данные, студенты учатся строить карты цитирования в программах визуализации научных ландшафтов – VOSviewer и CitNetExplorer, и составляют обзор литературы в той или иной области. Последняя часть курса посвящена работе с новостными базами данных.</p> |                        |                   |          |                      |                        |
| Образовательные результаты по дисциплине   | <p>В результате курса студенты смогут:</p> <ul style="list-style-type: none"> <li>- работать с различными видами баз данных, используемых для академической и новостной аналитики;</li> <li>- находить релевантные данные и академическую литературу;</li> <li>- применять сетевые методы для анализа данных о цитировании;</li> <li>- использовать полученные результаты при подготовке аналитических обзоров.</li> </ul>  |                        |                   |          |                      |                        |
| <b>Краткое содержание дисциплины</b>   |   |                        |                   |          |                      |                        |
| №  | Раздел курса  | Всего                  | Аудиторная работа |          |                      | Самостоятельная работа |
|  |   |                        | Лекции            | Семинары | Практические занятия |                        |
| 1  | Принципы организации литературного обзора   | 36                     | 4                 | 6        |                      | 26                     |

|                            |   |     |   |    |   |     |
|----------------------------|---|-----|---|----|---|-----|
| 2                          | Принципы работы с библиографическими базами данных (Web of Science, Scopus)   | 58  | 4 | 10 | 2 | 42  |
| 3                          | Построение научных карт в VOSviewer, CitNetExplorer   | 76  |   | 10 | 2 | 64  |
| 4                          | Принципы работы с новостными базами данных (Integrum, Factiva)  | 20  |   |    | 2 | 18  |
| <b>Всего часов</b>         |   | 190 | 8 | 26 | 6 | 150 |
| Образовательные технологии | Проектный метод, peer-to-peer learning, peer-to-peer assessment, контекстное обучение   |     |   |    |   |     |
| Формы контроля             | Накопленная оценка включает оценку за: <ul style="list-style-type: none"> <li>● 3 домашних задания (40%)</li> <li>● Итоговый проект и презентацию (60%)</li> </ul> Результирующая оценка равняется накопленной.   |     |   |    |   |     |
| Литература                 | <u>Основная</u> <ol style="list-style-type: none"> <li>1. Goker, A., Davies, J., &amp; Ridley, D. D. (2009). <i>Information Retrieval: Searching in the 21st Century</i>. New York, United Kingdom: John Wiley &amp; Sons, Incorporated.<br/><a href="https://proxylibrary.hse.ru:2176/article/10.1007%2Fs10791-010-9159-z">https://proxylibrary.hse.ru:2176/article/10.1007%2Fs10791-010-9159-z</a></li> <li>2. Wang, G. T., &amp; Park, K. (2015). <i>Student Research and Report Writing: From Topic Selection to the Complete Paper</i>. Hoboken, United Kingdom: John Wiley &amp; Sons, Incorporated.<br/><a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4205820">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4205820</a></li> </ol> <u>Дополнительная</u> <ol style="list-style-type: none"> <li>1. Torraco, R. J. (2005). Writing Integrative Literature Reviews: Guidelines and Examples. <i>Human Resource Development Review</i>, 4(3), 356–367.<br/><a href="https://proxylibrary.hse.ru:2145/doi/pdf/10.1177/1534484305278283">https://proxylibrary.hse.ru:2145/doi/pdf/10.1177/1534484305278283</a></li> </ol> |     |   |    |   |     |
| Преподаватель              | Vadim Voskresenskiy MA  |     |   |    |   |     |

## Course Syllabus

|                                  |  |                     |       |
|----------------------------------|--|---------------------|-------|
| Title of the course              | <b>Information Systems (offered in English) (for 2nd year students)</b>  |                     |       |
| Title of the Academic Programme  | Bachelor's Programme 'Sociology and Social Informatics'  |                     |       |
| Type of the course               | Obligatory   |                     |       |
| Prerequisites                    | Information Systems (for the 1st year students), Theory of Argumentation and Academic Writing  |                     |       |
| ECTS workload                    | 5  |                     |       |
| Total indicative study hours     | Directed Study   | Self-directed study | Total |
|                                  | 40   | 150                 | 190   |
| Course Overview                  | <p>The goal of the course is to introduce the methods of working with academic and news databases.</p> <p>During the course, the students learn to apply information resources and specialized software to preparing analytical literature reviews (bibliographic databases – Web of Science, Scopus) and reviewing the media data (news databases – Integrum, Factiva).</p> <p>We discuss the strategies of information retrieval and the principles of organizing a literature review, including the citation practices. The large part of the course is devoted to the principles of working with bibliographic databases: composing search query to gather citation data, using the in-built instruments to analyze scientific trends, exporting the data from the database. Using the obtained data, students practice building citation maps in the scientific landscape visualizing software (VOSviewer and CitNetExplorer) and write a literature review in a chosen field. The last part of the course is devoted to working with news databases.</p> |                     |       |
| Intended Learning Outcomes (ILO) | <p>Upon the course completion, students are expected to be able to:</p> <ul style="list-style-type: none"> <li>- Work with various types of databases used for academic and news analytics;</li> <li>- Find relevant data and academic literature;</li> <li>- Apply social network analysis methods to analyze citation data;</li> <li>- Use the results obtained during the preparation of analytical reviews for their coursework.</li> </ul>  |                     |       |
| Teaching and Learning Methods    | Project-based learning, peer-to-peer learning, peer-to-peer assessment, contextual learning.   |                     |       |

### Content and Structure of the Course

| № | Topic / Course Chapter  | Total | Directed Study |          |           | Self-directed Study |
|---|---|-------|----------------|----------|-----------|---------------------|
|   |   |       | Lectures       | Seminars | Tutorials |                     |
| 1 | Principles of the literature review organization                          | 36    | 4              | 6        |           | 26                  |
| 2 | Principles of working with citation databases (Web of Science and Scopus) | 58    | 4              | 10       | 2         | 42                  |
| 3 | Creating bibliographic maps in  | 76    |                | 10       | 2         | 64                  |

|  |  |     |            |    |              |     |
|--|--|-----|------------|----|--------------|-----|
|  | VOSViewer and CitNetExplorer   |     |            |    |              |     |
| 4  | Principles of working with news databases (Integrum, Factiva)  | 20  |            |    | 2            | 18  |
| <b>Total study hours</b>                   |  | 190 | 8          | 26 | 6            | 150 |
| Indicative Assessment Methods and Strategy | Cumulative grade consists of: <ul style="list-style-type: none"> <li>• 3 homework assignments (40% of the cumulative grade)</li> <li>• Final Project and Presentation (60% of the cumulative grade)</li> <li>• Resulting grade for the course is equal to cumulative grade.</li> </ul>   |     |            |    |              |     |
| Readings / Indicative Learning Resources   | <u>Mandatory</u> <ol style="list-style-type: none"> <li>1. Goker, A., Davies, J., &amp; Ridley, D. D. (2009). <i>Information Retrieval: Searching in the 21st Century</i>. New York, United Kingdom: John Wiley &amp; Sons, Incorporated.<br/><a href="https://proxylibrary.hse.ru:2176/article/10.1007%2Fs10791-010-9159-z">https://proxylibrary.hse.ru:2176/article/10.1007%2Fs10791-010-9159-z</a></li> <li>2. Wang, G. T., &amp; Park, K. (2015). <i>Student Research and Report Writing: From Topic Selection to the Complete Paper</i>. Hoboken, United Kingdom: John Wiley &amp; Sons, Incorporated.<br/><a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4205820">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4205820</a></li> </ol> <u>Optional</u> <ol style="list-style-type: none"> <li>1. Torraco, R. J. (2005). Writing Integrative Literature Reviews: Guidelines and Examples. <i>Human Resource Development Review</i>, 4(3), 356–367.<br/><a href="https://proxylibrary.hse.ru:2145/doi/pdf/10.1177/1534484305278283">https://proxylibrary.hse.ru:2145/doi/pdf/10.1177/1534484305278283</a></li> </ol> |     |            |    |              |     |
| Indicative Self- Study Strategies          | <b>Type</b>  |     | <b>+/-</b> |    | <b>Hours</b> |     |
|  | Reading for seminars / tutorials (lecture materials, mandatory and optional resources)   |     | +          |    | 30           |     |
|  | Assignments for seminars / tutorials / labs  |     | +          |    | 45           |     |
|  | E-learning / distance learning (MOOC / LMS)  |     | -          |    |              |     |
|  | Fieldwork  |     | -          |    |              |     |
|  | Project work   |     | +          |    | 75           |     |
|  | Other (please specify)   |     | -          |    |              |     |
|  | Preparation for the exam   |     | -          |    |              |     |
| Academic Support for the Course            | Academic support for the course is provided via e-mail   |     |            |    |              |     |
| Facilities, Equipment and Software         | Computer class, access to HSE electronic resources, MS Office, Zotero/Mendeley, VOSviewer, CitNetExplorer  |     |            |    |              |     |
| Course Instructor                          | Vadim Voskresenskiy MA   |     |            |    |              |     |

## Course Content

### Topic 1 - Principles of literature review organization:

- 1) Introduction to reviewing the literature. Principles of writing a literature review.
- 2) Course organization and policies. Resources for information retrieval. From research interest to research topic: constructing subject and object of research. Adapting the topic for bibliographic databases: keywords.

### Topic 2 - Principles of working with citation databases (Web of Science and Scopus):

- 3) Introduction to bibliographic databases. Writing a query.
- 4) Introduction to bibliographic networks. Citation practices. Predecessors/successors in citation networks. Network clustering.
- 5) Modifying the query for bibliometric databases. Data export. Citation software.

### Topic 3 - Creating bibliographic maps in VOSViewer and CitNetExplorer:

- 6) VOSviewer interface. Term maps. Co-citation and bibliographic coupling maps.
- 7) CitNetExplorer. Dynamics in citation networks.
- 8) Academic reading and writing tips. Structuring a literature review.
- 9) Analysing citation maps. Reporting the findings.

### Topic 4 - Principles of working with news databases (Integrum, Factiva):

- 10) Working with news databases.

## Assessment Methods and Criteria

### Assessment Methods

| Types of Assessment  | Forms of Assessment      | Modules |   |   |   |
|----------------------|--------------------------|---------|---|---|---|
|                      |                          | 1       | 2 | 3 | 4 |
| Formative Assessment | Home Assignments         |         | * | * |   |
|                      | Project and Presentation |         |   | * |   |

### Project Work

Your final project is the extended literature review on your topic.

The review should be structured as follows:

#### I. Introduction (200-300 words)

State your research topic and argue why it is important to study. On one of the last seminars, we discussed how to present the importance of the topic. You can show that with the help of statistics, you also can find gaps in the existing debate. The Strong introduction includes a combination of these elements. If you motivate your personal interest in the topic, this adds a nice background to the essay, but you cannot support the relevance of the topic with personal interest only.

#### II. Data & Method (100-200 words)

Describe and motivate your search query, the database you used for downloading items (Scopus or Web of Science), filtration parameters. If you filter your items by year, explain why you chose exactly this timespan. State the date when you downloaded the data.

Briefly describe which maps you created, why you chose them, and how the networks/maps are organized – what are the nodes, what do the connections mean, what do the sizes and the colors stand for, etc. Make an incompetent reader completely understand what s/he sees on the pictures.

#### III. Analysis (1000-1500 words)

Divide this part into sections and subsections.

In the first section, give definitions of the main terms you are interested in. Also, give a short description of how your field was developing. Look at the second home assignment.

The next sections of the Analysis should correspond to your clusters from VOSviewer and CitNetExplorer.

In the beginning of each section, present the idea and specific features of this cluster. Here, you can give some information about common methodological and/or theoretical approaches applied by researchers from this cluster. The simplest way to identify main clusters in your field is to create co-citation/bibliographic coupling map on authors. After that, you can look at the profiles of the researchers and at the abstracts of their papers. Don't take those clusters which do not fit your topic.

Further, summarize the main works related to this cluster.

You can do this with help of CitNetExplorer. Remember that if you do not include non-matching references (you have this option before your map is created), your clusters in CitNetExplorer will be very different from the clusters in VOSviewer.

After creating a map with non-matching references, the clusters from CitNetExplorer will be similar to your clusters from VOSviewer, but some close clusters in VOSviewer might be merged into one cluster. As you re-apply the clustering algorithm, they will split up.

In the description of clusters and subclusters, look at 1-2 pioneering works, 3-4 works with the highest citation rates, and 2-3 the most recent works.

If you work with Scopus data, you can transform it into Web of Science format with help of CRExplorer (<http://andreas-thor.github.io/cre/#>).

#### IV. Conclusion (100-200 words)

Summarize your main findings.

#### V. References

Minimum number of references: 20

### Assessment Criteria

| Grades             | Assessment Criteria   |
|--------------------|---|
| «Excellent» (8-10) | A well-structured, analytical presentation of project work. Shows strong evidence and broad background knowledge. In a group presentation, all members contribute equally and each contribution builds on the previous one clearly; Answers to follow-up questions reveal a good range and depth of knowledge beyond that covered in the presentation and |

|                      |  |
|----------------------|--|
|                      | show confidence in the discussion.   |
| «Good» (6-7)         | Clearly organized analysis, showing evidence of a good overall knowledge of the topic. The presenter of the project work highlights key points and responds to follow up questions appropriately. In group presentations there is evidence that the group has met to discuss the topic and is presenting the results of that discussion, in order previously agreed.   |
| «Satisfactory» (4-5) | Takes a very basic approach to the topic, using broadly appropriate material but lacking focus. The presentation of project work is largely unstructured, and some points are irrelevant to the topic. Knowledge of the topic is limited and there may be evidence of a basic misunderstanding. In a group presentation, most of the work is done by one or two students and individual contributions do not add up. |
| «Fail» (0-3)         | Fails to demonstrate any appropriate knowledge.  |

## Home Assignments

### Example Home Assignment I

- 1) Describe your research topic and its relevance.
  - 2) Search query. Include your full final search query, with the filters applied to the results, and the number of items you got. You can use Web of Science or Scopus data.
  - 3) The map of co-occurrence of terms in VOSviewer, exported from the software, with relevant titles (Figure 1. <The Title>). Describe briefly which research topics (or methodological approaches) are represented by clusters in your map.
  - 4) The map on co-citation (or bibliographic coupling), exported from the software, with relevant titles. Describe how the found clusters differ, which scientific subfields they represent, and who are the main authors in these clusters. You shouldn't read papers of these authors but you need to go through their profile pages on Google Scholar and look at the abstracts of their papers which are included in the results of your search query (if they are).  
Write which clusters better suit your research topic and why.
  - 5) References. Do not forget to add citations of the sources you refer to.
- Required word count for the work: not less than 400 words.  
You should use no less than 7 references in your work.

### Example Home Assignment II

You should look at how your research field has been developing in dynamics. For that:

- 1) Draw a line chart representing how the number of articles was changing from the first year in your timespan to our days. Remember to not include the current year in the line chart.  
To draw the line chart in Web of Science, you need to choose the option to Analyze Results (it appears on the page with the results of your query) and download txt file with the information about how many records were published each year. After that, you can visualize this distribution in Excel.  
Scopus will draw a line chart for you after you choose the option Analyze search results.  
Do not forget to filter the results by categories.
- 2) Divide your line chart into time periods.
- 3) Create co-citation/bibliographic coupling maps (in VOSviewer) on journals (sources) and authors for each time period. Describe how your field was changing. Pay attention to the appearance of new clusters or division of old clusters in separate parts. Also, look how the sizes of the nodes in your map changed.  
Please, include in the text report only the pictures that show some significant changes between the time periods you compare. Put all the other pictures in the appendix after the main text.

4) Identify which papers were the most important for each time period. For that, you can use CitNetExplorer and divide the map on the base of time periods or create citation map on documents for each time period in VOSviewer.

5) Include in-text citations and references formatted in APA or Chicago.

Minimum number of words (not including references): 500

Minimum number of references: 10

### Assessment Criteria

| Grades               | Assessment Criteria   |
|----------------------|---|
| «Excellent» (8-10)   | Has a clear argument, which addresses the topic and responds effectively to all aspects of the task. Fully satisfies all the requirements of the task; rare minor errors occur;   |
| «Good» (6-7)         | Responds to most aspects of the topic with a clear, explicit argument. Covers the requirements of the task; may produce occasional errors.  |
| «Satisfactory» (4-5) | Generally addresses the task; the format may be inappropriate in places; display little evidence of (depending on the assignment): independent thought and critical judgement include a partial superficial coverage of the key issues, lack critical analysis, may make frequent errors. |
| «Fail» (0-3)         | Fails to demonstrate any appropriate knowledge.   |

### Recommendations for students about organization of self-study

Self-study is organized in order to:

- Learn how to use regulatory, referential information and professional literature;
- Develop cognitive and soft skills: creativity and self-sufficiency;
- Enhance critical thinking and personal development skills;
- Develop research skills;
- Obtain skills of efficient independent professional activities.

Self-study, which is not included into a course syllabus, but aimed at extending knowledge about the subject, is up to the student's own initiative. A teacher recommends relevant methods for self-study and demonstrates students' past experiences. Tasks for self-study and its content can vary depending on the individual characteristics of a student. Self-study can be arranged individually or in peer-to-peer form both offline and online depending on the objectives, topics and difficulty degree. Assessment of self-study is made in the framework of teaching load for seminars.

### Special conditions for organization of learning process for students with special needs

The following types of comprehension of learning information (including e-learning and distance learning) can be offered to students with disabilities (by their written request) in accordance with their individual psychophysical characteristics:

- 1) *for persons with vision disorders*: a printed text in enlarged font; an electronic document; audios (transferring of learning materials into the audio); an individual advising with an assistance of a sign language interpreter; individual assignments and advising.
- 2) *for persons with hearing disorders*: a printed text; an electronic document; video materials with subtitles; an individual advising with an assistance of a sign language interpreter; individual assignments and advising.
- 3) *for persons with muscle-skeleton disorders*: a printed text; an electronic document; audios; individual assignments and advising.

## Аннотация

|  |   |                        |       |
|--|---|------------------------|-------|
| Название дисциплины  | <b>Информационные системы (преподается на английском языке) – для студентов 3-го курса</b>  |                        |       |
| Образовательная программа  | Бакалаврская программа «Социология и социальная информатика»  |                        |       |
| Тип дисциплины   | Обязательная  |                        |       |
| Требования к уровню знаний студентов, необходимых для освоения дисциплины (пререквизиты) | Нет   |                        |       |
| Объем з.е.   | 4   |                        |       |
| Объем в часах  | Аудиторная работа   | Самостоятельная работа | Всего |
|  | 32  | 120                    | 152   |
| Краткое описание курса   | <p>Курс посвящен принципам визуализации данных и использованию программного обеспечения для этих целей. Теоретическая часть курса знакомит студентов с основами визуального восприятия человека, выбором подходящих под данные типов графиков и data storytelling (истории о данных).</p> <p>Основная цель этого курса - помочь студентам с визуализацией для их презентации во время учебы, выпускных работ и научных исследований. Особое внимание уделяется методам коммуникации данных с использованием визуальных диаграмм. Некоторые части курса будут посвящены методам визуализации бизнеса и аналитики.</p> <p>Практическая часть представляет собой комплекс методов визуализации, применяемых в социальных науках, включая как базовые диаграммы, так и более сложные и редкие типы. В рамках курса развивается понимание методов визуализации, применяемых в исследованиях, и даются необходимые навыки для применения визуализации данных в исследованиях и работах.</p> |                        |       |
| Образовательные результаты по дисциплине   | <p>В результате курса студенты смогут:</p> <ul style="list-style-type: none"> <li>● Выбирать подходящие способы визуализации для специфичных данных</li> <li>● Эффективно презентовать данные исследования в визуальном формате</li> <li>● Эффективно выбирать цвета и типы визуализации</li> <li>● Создавать диаграммы разных типов.</li> <li>● Иметь навыки визуализации данных в основных инструментах и программах (Tableau, Excel, онлайн-инструменты)</li> <li>● Знать базовые принципы построения повествования (storytelling) на основе данных</li> </ul>   |                        |       |
| Образовательные технологии   | Практические занятия, семинарские занятия, групповая проектная работа, домашние задания   |                        |       |
| Краткое содержание дисциплины  |   |                        |       |

| №                  | Тема   | Всего часов  | Аудиторная работа |                      | Самостоятельная работа |
|--------------------|--|--|-------------------|----------------------|------------------------|
|                    |  |  | Лекции            | Практические занятия |                        |
| 1                  | Принципы визуализации данных   | 60   | 4                 | 12                   | 44                     |
| 2                  | Визуализация для бизнес-аналитики  | 52   | 4                 | 8                    | 40                     |
| 3                  | Улучшение использования базовых графиков и знакомство с более сложными типами визуализации | 40   | 0                 | 4                    | 36                     |
| <b>Всего часов</b> |  | 152  | 8                 | 24                   | 120                    |
| Формы контроля     |  | <p>Кумулятивная оценка состоит из:</p> <ul style="list-style-type: none"> <li>• 3 домашних задания (45% от накопленной оценки)</li> <li>• Письменный тест в классе (20% от накопленной оценки)</li> <li>• Итоговый проект и презентация (35% от накопленной оценки)</li> </ul> <p>Результирующая оценка равняется накопленной.</p>   |                   |                      |                        |
| Литература         |  | <p><u>Основная</u></p> <ol style="list-style-type: none"> <li>1. Knaflic, C.N., 2015. <i>Storytelling with data: A data visualization guide for business professionals</i>. John Wiley &amp; Sons.<br/><a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4187267">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4187267</a></li> <li>2. Monsey, M. and Sochan, P., 2016. <i>Tableau For Dummies</i>. John Wiley &amp; Sons.<br/><a href="https://proxylibrary.hse.ru:2258/toc.aspx?bookid=105577">https://proxylibrary.hse.ru:2258/toc.aspx?bookid=105577</a></li> </ol> <p><u>Дополнительная</u></p> <ol style="list-style-type: none"> <li>1. Acharya, Seema, and Subhashini Chellappan. 2016. <i>Pro Tableau: A Step-by-Step Guide</i>. 1st ed. Berkely, CA, USA: Apress.<br/><a href="https://proxylibrary.hse.ru:2258/toc.asp?bookid=125416">https://proxylibrary.hse.ru:2258/toc.asp?bookid=125416</a></li> <li>2. Rahlf, Thomas. 2017. <i>Data Visualisation with R: 100 Examples</i>. Springer International Publishing.<br/><a href="https://proxylibrary.hse.ru:2258/library.asp?&amp;bookid=138088">https://proxylibrary.hse.ru:2258/library.asp?&amp;bookid=138088</a></li> <li>3. Niall, Keith K., ed. 2017. <i>Erwin Schrödinger's Color Theory: Translated with Modern Commentary</i>. Springer International Publishing. //www.springer.com/gp/book/9783319646190.<br/><a href="https://proxylibrary.hse.ru:2176/book/10.1007%2F978-3-319-64621-3">https://proxylibrary.hse.ru:2176/book/10.1007%2F978-3-319-64621-3</a></li> </ol> |                   |                      |                        |
| Преподаватель      |  | Анастасия Кузнецова, преподаватель   |                   |                      |                        |

## Course Syllabus

| Title of the course                        | <b>Information Systems (offered in English) (for the 3rd year students)</b>   |                     |                |           |                     |
|--|---|---------------------|----------------|-----------|---------------------|
| Title of the Academic Programme            | Bachelor's Programme 'Sociology and Social Informatics'   |                     |                |           |                     |
| Type of the course                         | Obligatory  |                     |                |           |                     |
| Prerequisites                              | None  |                     |                |           |                     |
| ECTS workload                              | 4   |                     |                |           |                     |
| Total indicative study hours               | Directed Study  | Self-directed study | Total          |           |                     |
|  | 32  | 120                 | 152            |           |                     |
| Course Overview                            | <p>The course on Information Systems for the 3rd year students focuses on principles of data visualization and comprehensive set software tools for it. The theoretical part of the course introduces the basics of human visual perceptions, choice of appropriate graphics, its design and storytelling with data.</p> <p>The main purpose of this course is to help students with their scientific visualization for presentation during their study, their final papers and research. The focus is on data communication and presentations techniques with visual diagrams. Some parts of the course would be devoted to business visualization techniques.</p> <p>The practical part provides a complex of visualization techniques, applied in Social Sciences, including both primary and unusual diagrams. It develops an understanding of the visualization techniques applied in research and gives needed skills for application of data visualization in their future study and works. Moreover, both programming, via tools and drawing techniques of data visualization would be discussed.</p> |                     |                |           |                     |
| Intended Learning Outcomes (ILO)           | <p>Upon the course completion, students are expected to be able to:</p> <ul style="list-style-type: none"> <li>● Find appropriate graphics for their data</li> <li>● Communicate data from the research efficiently</li> <li>● Choose colors and shapes of visualization more efficiently</li> <li>● Have knowledge of where it is possible to produce different types of diagrams</li> <li>● Have skills of data visualizations in the main tools and software (Tableau, Excel, online tools)</li> <li>● Be familiar with the basics of data storytelling</li> </ul>   |                     |                |           |                     |
| Teaching and Learning Methods              | Teaching and learning methods include tutorials, seminars, group work, home assignments   |                     |                |           |                     |
| <b>Content and Structure of the Course</b> |   |                     |                |           |                     |
| №  | Topic / Course Chapter  | Total               | Directed Study |           | Self-directed Study |
|  |   |                     | Lectures       | Tutorials |                     |
| 1  | Principles of data visualization  | 60                  | 4              | 12        | 44                  |
| 2  | Visualization for business analysis   | 52                  | 4              | 8         | 40                  |

|  |   |     |            |              |     |
|--|---|-----|------------|--------------|-----|
| 3  | Improving graphics and unusual diagrams   | 40  | 0          | 4            | 36  |
| <b>Total study hours</b>                   |   | 152 | 8          | 24           | 120 |
| Indicative Assessment Methods and Strategy | <p>Cumulative grade consists of:</p> <ul style="list-style-type: none"> <li>• 3 homework assignments (45% of the cumulative grade)</li> <li>• In-class written assignments (test) (20% of the cumulative grade)</li> <li>• Final group project (35% of the cumulative grade)</li> </ul> <p>Resulting grade for the course is equal to cumulative grade.</p>   |     |            |              |     |
| Readings / Indicative Learning Resources   | <p><u>Mandatory</u></p> <ol style="list-style-type: none"> <li>1. Knaflic, C.N., 2015. <i>Storytelling with data: A data visualization guide for business professionals</i>. John Wiley &amp; Sons.<br/><a href="https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4187267">https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=4187267</a></li> <li>2. Monsey, M. and Sochan, P., 2016. <i>Tableau For Dummies</i>. John Wiley &amp; Sons.<br/><a href="https://proxylibrary.hse.ru:2258/toc.aspx?bookid=105577">https://proxylibrary.hse.ru:2258/toc.aspx?bookid=105577</a></li> </ol> <p><u>Optional</u></p> <ol style="list-style-type: none"> <li>1. Acharya, Seema, and Subhashini Chellappan. 2016. <i>Pro Tableau: A Step-by-Step Guide</i>. 1st ed. Berkely, CA, USA: Apress.<br/><a href="https://proxylibrary.hse.ru:2258/toc.asp?bookid=125416">https://proxylibrary.hse.ru:2258/toc.asp?bookid=125416</a></li> <li>2. Rahlf, Thomas. 2017. <i>Data Visualisation with R: 100 Examples</i>. Springer International Publishing.<br/><a href="https://proxylibrary.hse.ru:2258/library.asp?&amp;bookid=138088">https://proxylibrary.hse.ru:2258/library.asp?&amp;bookid=138088</a></li> <li>3. Niall, Keith K., ed. 2017. <i>Erwin Schrödinger's Color Theory: Translated with Modern Commentary</i>. Springer International Publishing. //www.springer.com/gp/book/9783319646190.<br/><a href="https://proxylibrary.hse.ru:2176/book/10.1007%2F978-3-319-64621-3">https://proxylibrary.hse.ru:2176/book/10.1007%2F978-3-319-64621-3</a></li> </ol> |     |            |              |     |
| Indicative Self- Study Strategies          | <b>Type</b>   |     | <b>+/-</b> | <b>Hours</b> |     |
|  | Reading for seminars / tutorials (lecture materials, mandatory and optional resources)  |     | +          | 40           |     |
|  | Assignments for seminars / tutorials / labs   |     | +          | 30           |     |
|  | E-learning / distance learning (MOOC / LMS)   |     | -          |              |     |
|  | Fieldwork   |     | -          |              |     |
|  | Project work  |     | +          | 50           |     |
|  | Other (please specify)  |     | -          |              |     |
|  | Preparation for the exam  |     | -          |              |     |
| Academic Support for the Course            | Academic support for the course is provided via e-mail  |     |            |              |     |
| Facilities, Equipment and Software         | A computer class with projector, Tableau, MS Office   |     |            |              |     |
| Course Instructor                          | Anastasiya Kuznetsova   |     |            |              |     |

**Course Content**

**Topic 1 - Principles of data visualization:**

1) Basics of data visualization and visual perception.  
History of data visualization and key figures. Main concepts of visual perception of graphics.

2) Getting started with Tableau  
Overview of the Tableau interface. How to make bar charts, scatter plots and line graphs. Data aggregation and data filtering with continuous, categorical and time data.

**Topic 2 - Visualization for business analysis:**

3) Information Dashboards Design  
Main rules for making efficient dashboards. What is KPI and how to make them in Tableau. The use of calculated fields for data analysis in Tableau.

4) Dashboards in Data Studio  
Connection to data sources and making real-time dashboards in online tool Google Data Studio.

**Topic 3 - Improving graphics and unusual diagrams:**

5) Choosing the best graphics for your data  
Overview of data types and diagrams for efficient data communication. How to make highlights at the diagrams.

6) Practising different types of diagrams  
Working with different types of diagrams and their use for data analysis. A Proper explanation of statistical diagrams - box plots and correlation plots.

7) Maps and networks  
Desktop and online tools for making maps. Basics of work with Russian geodata. Basics of Gephi. An overview of online tools for visualizing networks.

8) Data storytelling  
Making an efficient presentation with data storyline. Basics of infographics.

9) Project presentations  
Final presentations of group projects.

**Assessment Methods and Criteria**

**Assessment Methods**

| Types of Assessment | Forms of Assessment | Modules |   |   |   |
|---------------------|---------------------|---------|---|---|---|
|                     |                     | 1       | 2 | 3 | 4 |
|                     |                     |         |   |   |   |

|                      |          |  |  |   |  |
|----------------------|----------|--|--|---|--|
| Formative Assessment | Test     |  |  | * |  |
|                      | Project  |  |  | * |  |
|                      | Homework |  |  | * |  |

## Assessment Criteria

### Project Work

For your final project you have to find data about the topic you are interested in and make a data story-telling presentation:

- explain why you are interrelated in that topic or why is that important to study it
- make no less than 5 diagrams which describe your data efficiently
- describe diagrams with highlighting techniques
- make conclusions about your data and topics of study

That should be a data storytelling project - the main aim is to tell everyone the story about your data and your topic, so you can choose any kind of interactive materials you want. The format is pptx presentation/ Tableau data story or infographics.

| Grades               | Assessment Criteria  |
|----------------------|--|
| «Excellent» (8-10)   | A well-structured, analytical presentation of project work. Shows strong evidence and broad background knowledge. In a group presentation, all members contribute equally and each contribution builds on the previous one clearly; Answers to follow-up questions reveal a good range and depth of knowledge beyond that covered in the presentation and show confidence in the discussion.                       |
| «Good» (6-7)         | Clearly organized analysis, showing evidence of a good overall knowledge of the topic. The presenter of the project work highlights key points and responds to follow up questions appropriately. In group presentations, there is evidence that the group has met to discuss the topic and is presenting the results of that discussion, in order previously agreed.  |
| «Satisfactory» (4-5) | Takes a very basic approach to the topic, using broadly appropriate material but lacking focus. The presentation of project work is largely unstructured, and some points are irrelevant to the topic. Knowledge of the topic is limited and there may be evidence of basic misunderstanding. In a group presentation, most of the work is done by one or two students and individual contributions do not add up. |
| «Fail» (0-3)         | Fails to demonstrate any appropriate knowledge.  |

### Tests

#### Example of the test

This test includes two parts. The first one is based on our lectionary and theory behind data visualization. The second one is based on your practice - you have to make diagrams with the provided data (sales dataset) and answer the questions about this data.

1. How many colors it is better to use for data visualization?
2. What does this dots at the box plot mean?
3. Tell at least three Gestalt principles of data visualization (you can write them in your own words)
4. What does KPI mean?
5. What types of diagrams can show a comparison between categories in the data? (Write at least 2 types of diagrams)
6. What product category has the highest average price?
7. How many products were sold in January 2015?
8. What is the difference in the number of products sold between January and February in 2015?
9. What country has the third place by the number of products sold?
10. What is the most frequent weekday when our customers order items?

| Grades               | Assessment Criteria   |
|----------------------|---|
| «Excellent» (8-10)   | Has a clear argument, which addresses the topic and responds effectively to all aspects of the task. Fully satisfies all the requirements of the task; rare minor errors occur;   |
| «Good» (6-7)         | Responds to most aspects of the topic with a clear, explicit argument. Covers the requirements of the task; may produce occasional errors.  |
| «Satisfactory» (4-5) | Generally addresses the task; the format may be inappropriate in places; display little evidence of (depending on the assignment): independent thought and critical judgement include a partial superficial coverage of the key issues, lack critical analysis, may make frequent errors. |
| «Fail» (0-3)         | Fails to demonstrate any appropriate knowledge.   |

## Homework Assignments

### Example of Homework

In this homework assignment you have to make a dashboard based on the questions below. You have to make different diagrams for each question and make a dashboard based on it. Publish your final dashboard to Tableau Public and send the link to that.

1) Where are our customers from? Create new categories of regions (North - AC, AP, AM, PA, RO, RR, TO; Northeast - AL, BA, CE, MA, PE, PI, RN, SE; Central-West - GO, MT, MS, DF; Southeast - ES, MG, RJ, SP; South - PR, RS, SC)

You can make a map but don't forget to edit the country at "Edit Locations" to Brazil. Also add the filter with these new categories.

2) What are the TOP 15 states, from which customers make orders which cost (payment value) more than the average?

3) What are the most popular types of payments? (Show TOP 10).

4) What is the most frequent month and weekday when our customers order items (take order\_approved date)?

5) Is there any relation between payment value and a number of installments?

6) What is the average payment value and average delivery time (the difference between approved and delivered to the customer dates)? (Show as a table)

| Grades             | Assessment Criteria   |
|--------------------|---|
| «Excellent» (8-10) | The assignment is complete. Fully satisfies all the requirements of the task. All methods |

|                      |   |
|----------------------|---|
|                      | are applied correctly, the results are interpreted on the basis of the theoretical background of the course. A written report is provided.  |
| «Good» (6-7)         | The assignment is complete but requires some modifications. Satisfies no less than 80% of all the requirements of the task. The analysis methods are applied correctly, the results are interpreted. There are some remarks and inaccuracies. A written report is provided. |
| «Satisfactory» (4-5) | The project is partially complete. Satisfies no less than 60% of all the requirements of the task. Not all methods are applied correctly, some inaccuracies with results interpretation. A written report is provided.  |
| «Fail» (0-3)         | The project is partially complete. Satisfies less than 60% of all the requirements of the task. The results are not interpreted or a written report is not provided.  |

### **Recommendations for students about organization of self-study**

Self-study is organized in order to:

- Systemize theoretical knowledge received at lectures;
- Extending theoretical knowledge;
- Learn how to use legal, regulatory, referential information and professional literature;
- Development of cognitive and soft skills: creativity and self-sufficiency;
- Enhancing critical thinking and personal development skills;
- Development of research skills;
- Obtaining skills of efficient independent professional activities.

Self-study, which is not included into a course syllabus, but aimed at extending knowledge about the subject, is up to the student's own initiative. A teacher recommends relevant resources for self-study, defines relevant methods for self-study and demonstrates students' past experiences. Tasks for self-study and its content can vary depending on individual characteristics of a student. Self-study can be arranged individually or in groups both offline and online depending on the objectives, topics and difficulty degree. Assessment of self-study is made in the framework of teaching load for seminars or tests.

In order to show the outcomes of self-study it is recommended:

- Make a plan for 3-5 presentation which will include topic, how the self-study was organized, main conclusions and suggestions and its rationale and importance.
- Supply the presentation with illustrations. It should be defined by an actual task of the teacher.

### **Special conditions for organization of learning process for students with special needs**

The following types of comprehension of learning information (including e-learning and distance learning) can be offered to students with disabilities (by their written request) in accordance with their individual psychophysical characteristics:

- 1) *for persons with vision disorders*: a printed text in enlarged font; an electronic document; audios (transferring of learning materials into the audio); an individual advising with an assistance of a sign language interpreter; individual assignments and advising.
- 2) *for persons with hearing disorders*: a printed text; an electronic document; video materials with subtitles; an individual advising with an assistance of a sign language interpreter; individual assignments and advising.
- 3) *for persons with muscle-skeleton disorders*: a printed text; an electronic document; audios; individual assignments and advising.