

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

Факультет Санкт-Петербургская школа экономики и менеджмента  
Департамент менеджмента

**Рабочая программа дисциплины**

Информационный менеджмент /

Information Management

для образовательной программы «Международный бизнес и менеджмент»  
направления подготовки 38.03.02 «Менеджмент»  
уровень – бакалавриат, 4 курс (1-2 модули 2019/2020 уч. года)

Разработчик:

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Согласована начальником ОСУП в бакалавриате по направлению менеджмент

« \_\_\_\_ » \_\_\_\_\_ 2019 г.

Бойко К.А. \_\_\_\_\_

Утверждена Академическим советом образовательной программы

« \_\_\_\_ » \_\_\_\_\_ 2019 г., № протокола \_\_\_\_\_

Академический руководитель образовательной  
программы Даунинг Дж. \_\_\_\_\_

Санкт-Петербург, 2019

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## Аннотация

Название дисциплины	Информационный менеджмент		
Образовательная программа	«Международный бизнес и менеджмент» 38.03.02 «Менеджмент»		
Тип дисциплины	Обязательный (Blended)		
Требования к уровню знаний студентов, необходимых для освоения дисциплины (пререквизиты)	Теория вероятностей и математическая статистика, Эконометрика		
Объем з.е.	6		
Объем в часах	Аудиторная работа	Самостоятельная работа	Всего
	52	176	228
Краткое описание курса	Практико-ориентированный курс, посвященный анализу данных и методам их обработки в специализированных программных средах таких как Python. Основным принципом является изучение существующих закономерностей в данных, построение моделей прогнозирования для решения сложных задач в сфере менеджмента.		
Образовательные результаты по дисциплине	<ul style="list-style-type: none"> <li>• Способен к самостоятельному освоению новых методов исследований, изменению научного и производственного профиля своей деятельности</li> <li>• Способен принимать управленческие решения и готов нести за них ответственность</li> <li>• Способен выявлять данные, необходимые для решения поставленных исследовательских задач в сфере управления; осуществлять сбор данных, как в полевых условиях, так и из основных источников социально-экономической информации: отчетности организаций различных форм собственности, ведомств и т.д., баз данных, журналов, и др., анализ и обработку этих данных, информацию отечественной и зарубежной статистики о социально-экономических процессах и явлениях</li> <li>• Способен выбирать инструментальные средства, современные технические средства и информационные технологии для обработки информации в соответствии с поставленной научной задачей в сфере управления</li> </ul>		
Краткое содержание дисциплины	<ol style="list-style-type: none"> <li>1. Введение в язык программирования Python</li> <li>2. Обработка данных в Python</li> <li>3. Визуализация данных в Python</li> <li>4. Сбор данных из открытых Интернет-источников в Python</li> <li>5. Алгоритмы машинного обучения в сфере менеджмента</li> </ol>		
Образовательные технологии	<ul style="list-style-type: none"> <li>• Каждую неделю дается 2-часовой практический семинар для изучения методов обработки данных.</li> <li>• Развитие навыков программирования в Python.</li> </ul>		
Формы контроля	<p>Формула оценки:  <math>O_{\text{итоговая}} = 0.25 * (O_1 + O_2 + O_3 + O_4)</math></p> <p>O<sub>1</sub> – лабораторная работа №1 в Python  O<sub>2</sub> – прохождение MOOC  O<sub>3</sub> – лабораторная работа №2 в Python  O<sub>4</sub> – групповой проект в Python</p> <p>O<sub>1</sub>, O<sub>2</sub>, O<sub>3</sub>, O<sub>4</sub> – целые числа от 0 до 10 включительно.  O<sub>итоговая</sub> – итоговая оценка, которая округляется по математическим правилам</p>		
Литература	<p><u>Основная</u>  Vanderplas, J.T. (2016). Python data science handbook: Essential tools for working with data. Sebastopol, CA: O'Reilly Media, Inc.  <a href="https://proxylibrary.hse.ru:2119/login.aspx?direct=true&amp;db=nlebk&amp;AN=1425081">https://proxylibrary.hse.ru:2119/login.aspx?direct=true&amp;db=nlebk&amp;AN=1425081</a>.</p>		
Преподаватель	Терников Андрей Александрович, преподаватель, деп.менеджмента		



Title of the course	Information Management				
Title of the Academic Programme	38.03.02. Management Bachelor program “International Business and Management Studies”				
Type of the course	Compulsory (Blended)				
Prerequisites	Probability Theory and Statistics, Econometrics				
ECTS workload	6				
Total indicative study hours	Directed Study	Self-directed study	Total		
	52	176	228		
Course Overview	During this practically oriented data analysis module students will learn how computer programs are used for running predictive models and analytics. The main principal is to explore existing data to build new knowledge, forecast future behavior, anticipate outcomes and trends. Explore theory and practice, and work with tools like Python to solve advanced data science problems in management sphere.				
Intended Learning Outcomes (ILO)	<p>Upon completing this course, students should be able to do the following:</p> <ul style="list-style-type: none"> <li>• Collect, store, process and analyze data automatically with the use of scripting languages.</li> <li>• Develop and apply new research methods of basic machine learning algorithms and ways to collect information using data mining techniques.</li> <li>• Solve economic, financial and managerial problems using best practices of data analysis using modern computational tools.</li> <li>• Can identify the data needed for addressing the financial and business objectives.</li> </ul>				
Teaching and Learning Methods	<ul style="list-style-type: none"> <li>• Every week a 2-hour tutorial is given to practice real-world data mining skills.</li> <li>• Developing programming skills in Python in desktop and web-based interfaces.</li> </ul>				
Content and Structure of the Course (see Annex 1)					
№	Topic / Course Chapter	Total	Directed Study		Self-directed Study
			Lectures	Tutorials	
1	Introduction to Python	57	-	13	44
2	Beginner Data Analysis in Python	57	-	13	44
3	Intermediate Data Analysis in Python	57	-	13	44
4	Advanced Data Analysis in Python	57	-	13	44
<b>Total study hours</b>		228	-	52	176
Indicative Assessment Methods and Strategy	<u>Assessment (see Annex 2)</u>  Assessment formula: $O_{\text{final}} = 0.25 * (O_1 + O_2 + O_3 + O_4)$  O <sub>1</sub> – Lab 1 in Python O <sub>2</sub> – MOOC O <sub>3</sub> – Lab 2 in Python O <sub>4</sub> – Group Project in Python  O <sub>1</sub> , O <sub>2</sub> , O <sub>3</sub> , O <sub>4</sub> – integer numbers from 0 to 10 including.  O <sub>final</sub> – final grade rounded with mathematical rules.				
Readings / Indicative Learning Resources	<u>Mandatory</u> Vanderplas, J.T. (2016). Python data science handbook: Essential tools for working with data. Sebastopol, CA: O’Reilly Media, Inc.				

	<a href="https://proxylibrary.hse.ru:2119/login.aspx?direct=true&amp;db=nlebk&amp;AN=1425081">https://proxylibrary.hse.ru:2119/login.aspx?direct=true&amp;db=nlebk&amp;AN=1425081</a> .		
Indicative Self- Study Strategies	<b>Type</b>	<b>+/-</b>	<b>Hours</b>
	Reading for seminars / tutorials	+	80
	Assignments for seminars / tutorials / labs	+	30
	E-learning / distance learning (MOOC / LMS)	+	36
	Project work	+	30
Academic Support for the Course	Academic support for the course is provided via LMS, where students can find: guidelines and recommendations for doing the course; guidelines and recommendations for self-study; samples of assessment materials. Recommended external support source is stackoverflow.com.		
Facilities, Equipment and Software	Python 3 with Jupyter Notebook and Spyder (installed with Anaconda)		
Recommendations for students on the organization of self-study	<p>Self-study work can be considered as an organizational form of training - a system of pedagogical conditions that ensure the management of educational activities for the development of knowledge and skills in the field of educational activities without assistance. The student needs to clearly understand that independent work is not just a prerequisite but a necessary condition for obtaining knowledge of the discipline and the development of competencies required in future professional activities.</p> <p>In the educational process there are two types of independent work:</p> <ul style="list-style-type: none"> <li>• in-class;</li> <li>• out-of-class.</li> </ul> <p>In-class work on the discipline is carried out in the classroom under the direct supervision of the teacher and his task.</p> <p>Out-of-class work - the planned educational work of students, performed in out-of-class time on the instructions and methodological guidance of the teacher but without his direct participation.</p> <p>Types of tasks for out-of-class independent work, their content and nature can be variable and differentiated, take into account the individual characteristics of the student.</p> <p>Independent work can be carried out individually or by groups of students online and in the classroom, depending on the purpose, volume, specific topics of independent work, the level of complexity.</p> <p>Control of results of out-of-class independent work is carried out within the time allotted for compulsory training sessions on discipline at seminars or control classes.</p>		
Special conditions for organization of learning process for students with special needs	<p>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:</p> <ol style="list-style-type: none"> <li>1) <i>for persons with vision disorders</i>: 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.</li> <li>2) <i>for persons with hearing disorders</i>: 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.</li> <li>3) <i>for persons with muscle-skeleton disorders</i>: a printed text; an electronic document; audios; individual assignments and advising.</li> </ol>		
Course Instructor	Andrei A. Ternikov, Lecturer, Department of Management		

<b>Programme ILO(s)</b>	<b>Course ILO(s)</b>	<b>Teaching and Learning Methods for delivering ILO(s)</b>	<b>Indicative Assessment Methods of Delivered ILO(s)</b>
<b>UC-10</b> The ability to conduct applied activity in an international environment	Choose methods adequately corresponding to the objectives of a research project	Individual problem solving Discussion of real-time issues using terms and concepts studied in class	In-class discussions Reports
<b>PC-8</b> The ability to analyze and to design interpersonal, group, and organizational communication	Students should know how to: use ICT solutions in solving real-life problems, work together with other team members, develop personal knowledge and skills.	Group projects Research projects	Group projects
<b>PC-9</b> The ability to perform management functions in a multicultural environment	Students should know how to: work together with other team members, develop personal knowledge and skills.	Group projects Research projects	Group projects
<b>PC-17</b> The ability to develop managerial procedures and methods of control	Choose methods adequately corresponding to the objectives of a research project	Individual problem solving Discussion of real-time issues using terms and concepts studied in class	In-class discussions Reports
<b>PC-20</b> The ability to conduct an analysis of the competitive environment	Collect, store, process and analyze data automatically with the use of scripting languages; develop and apply new research methods and ways to collect information using data mining techniques	In-class/home assignments to solve computer exercises in data analysis software MOOCs	In-class quizzes Home assignments
<b>PC-25</b> The ability to conduct analyses of market and specific risks for taking management decisions	Able to choose tools, modern technical means and information technologies for processing information in accordance with the assigned scientific task in the field of management	Analysis of publications in leading academic journals MOOCs	In-class discussions Reports
<b>PC-26</b> The ability to conduct analyses of the operational activities of firms for preparing managerial decisions	Planning and beginning to perform a research project requires an open and innovative mindset	Problem-solving Discussions	Individual projects Group projects

**Course Content**

1. Information. Data Types. Introduction to Python
2. Managing files. Functions and Loops
3. Dictionaries. Numpy
4. Datasets. Pandas
5. Data Preparation
6. Lab 1 in Python
7. Getting Data from the Internet
8. Exploratory Data Analysis
9. Regression. Forecasting
10. Classification. Clustering
11. Lab 2 in Python
12. App Creation
13. App Deployment

## Assessment Methods and Criteria

### Assessment Methods

Types of Assessment	Forms of Assessment	Modules			
		1	2	3	4
Formative Assessment	Lab 1 in Python	*			
	MOOC		*		
	Lab 2 in Python		*		
	Group Project in Python		*		

### Assessment Criteria

#### Written Assignments (Labs in Python)

Each Lab consists of 10 computer exercises (in Python). Student should submit one file for each Lab in Jupyter Notebook format (\*.ipynb) with solutions.

Grades	Assessment Criteria and Points
«Excellent» (10)	Student found 10 correct solutions over 10 exercises.
«Excellent» (9)	Student found 9 correct solutions over 10 exercises.
«Excellent» (8)	Student found 8 correct solutions over 10 exercises.
«Good» (7)	Student found 7 correct solutions over 10 exercises.
«Good» (6)	Student found 6 correct solutions over 10 exercises.
«Satisfactory» (5)	Student found 5 correct solutions over 10 exercises.
«Satisfactory» (4)	Student found 4 correct solutions over 10 exercises.
«Fail» (3)	Student found 3 correct solutions over 10 exercises.
«Fail» (2)	Student found 2 correct solutions over 10 exercises.
«Fail» (1)	Student found 1 correct solution over 10 exercises.

**Hint:** Each Lab lasts 60 minutes. The student gets **an integer grade** for each task of a Lab. If the answer on the particular question in the Lab is not full (not all requirements of the task are done), then the student gets 0 (zero) points for such a task/question.

Moreover, the cheating is strongly prohibited during Labs (use of mobile devices, paper-based materials, cheatsheets, the Internet/LAN connection, talking with the other students and looking at the other screen or paper). In case of cheating - the student gets 0 (zero) points for the particular Lab.

## MOOC

**Coursera MOOC:** “Python Programming: A Concise Introduction” available here: <https://www.coursera.org/learn/python-programming-introduction> [hereinafter “MOOC”].

Final progress [hereinafter “progress”] of the MOOC is based on 4 Programming Assignments (each of 100%) with the following weights: 27%, 31%, 27%, 15%. So, the student after finishing the course can get the progress in the interval from 0% to 100% including.

Grade	Assessment Criteria and Points
«Excellent» (10)	Student has finished the MOOC with progress not less than 95%
«Excellent» (9)	Student has finished the MOOC with progress not less than 85% and less than 95%
«Excellent» (8)	Student has finished the MOOC with progress not less than 75% and less than 85%
«Good» (7)	Student has finished the MOOC with progress not less than 65% and less than 75%
«Good» (6)	Student has finished the MOOC with progress not less than 55% and less than 65%
«Satisfactory» (5)	Student has finished the MOOC with progress not less than 45% and less than 55%
«Satisfactory» (4)	Student has finished the MOOC with progress not less than 35% and less than 45%
«Fail» (3)	Student has finished the MOOC with progress not less than 25% and less than 35%
«Fail» (2)	Student has finished the MOOC with progress not less than 15% and less than 25%
«Fail» (1)	Student has finished the MOOC with progress less than 15%

**Hint:** The MOOC lasts for 4 weeks. Each student should register in the MOOC strictly within his/her corporate e-mail address (ending on @edu.hse.ru or @hse.ru) and your real First & Last names. The MOOC should be finished, and the progress should be submitted 7 days before the first day of the winter exam week (or earlier). The progress check and submission procedure are organized in LMS, where the student should attach both:

1. The screenshot of the MOOC grade page with progress and percentage which is given for each assignment. Screenshot should also capture in the same moment the top bar of the Coursera site interface with your profile name (real First and Last names).
2. The \*.gif-file or small (up to 10 seconds) video-file where you capture the following path in real time in your account: your profile settings screen (with name and e-mail) -> the screen with your courses -> the screen with the MOOC -> screen with grades of the MOOC (all grades should be also visible: ensure the proper quality of the file).

In case of late submit or not attaching at least one of the previous files in time or improper quality (non-readable grades page) of \*.gif / video-file or fabrication of results (the lecturer and the study office manager can ask the particular student to log-in in his/her account in real time from the particular computer in order to check the trustworthiness of the results): the student gets 0 (zero) points for the MOOC grade.

## Group Project (Written Assignment)

Group Project is data-driven research project or app written on the basis of Python programming language. Each group should consist in the range from 2 to 7 students including. Each group of students decides themselves which type of project they prepare: research-based or app-based.

The final submission includes: the file with the main steps of the research or practical implications in the form of the short report or presentation, the file with supported code and calculations. Each group submits such files in LMS. In case of late submission (after deadline in LMS) all group members get 0 (zero) points for the Group Project.

Each group project is assessed within the following criteria (each of 1 point):

#	Criteria Name	Criteria Description for 1 point (0 points if otherwise)
1	Submission	The project files are submitted in time in LMS.
2	Idea Description	The Idea of the project is clearly stated, aims and problems are clearly specified.
3	Literature Review	The presence of supporting evidence for the project Idea from the academic literature, the market analysis, case-studies etc. At least 5 sources.
4	Data	Data, which is used in the project, is properly and correctly described (the source, variables, descriptive statistics).
5	Methodology & Results	Methodology of how to analyze the given data within stated aims is properly and correctly described. Results of the project are clearly stated and do not contradict to the stated Idea and aims.
6	Data Analysis	Use of Python libraries (e.g. pandas) to prepare and analyze the data. The overall data preparation and analysis is correct. Non-trivial operations (such, that are not restricted with importing and printing the data) with data are done in correct manner.
7	Data Visualization	Use of Python libraries to prepare exploratory data analysis (visualization). Charts and graphs are made correctly.
8	Code	Python code is submitted and formatted in proper manner (use of comments for some parts of the code and functions, proper indents and linespacing). The volume of the meaningful code (except blank lines, comments) should be at least 50 lines.
9	Interface	On the basis of the project the user-interface is made in order to maintain the idea and the results of the project. Interface works properly and without errors.
10	Web-integration	The user-interface of the project results is available from the Internet (deployed as App).

The final grade for the Group Project is the sum of all points, according to provided criteria. Each group member of the certain group gets the same grade (the Group Project grade). Any kind of plagiarism is assessed as 0 (zero) points for the whole project.

## Sample Assessment Materials

## Sample Lab questions (in Python):

1. Rewrite and execute the loop in compact form (**one** line of code instead of 5)

```
y = list()
x = 'Student'
for i in range(1,6):
    y.append(x + str(i))
y
```

2. Write code that asks the user how many Fibonacci numbers to generate and then generates them (try to create separate list with two first values and iterate with sum of indexes [i] and [i-1]). Hint: The Fibonacci sequence is a sequence of numbers where the next number in the sequence is the sum of the previous two numbers in the sequence. The sequence looks like this: 1, 1, 2, 3, 5, 8, 13, ...
3. Make the function that takes as input three variables, and returns the **smallest** of the three (without **min()** function).

```
def func_name(x, y, z):
    .....
    return value_name
```