



APPROVED

Vice-rector for educational activities

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Бизнес-аналитика / Business Analytics

Syllabus of the course

Specialty	38.03.02 Management
Specialization	Business management and digital innovations
Level of higher education	Bachelor
Form of training	Full-time
Year of enrollment	2023

Authored by:

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Total number of hours	108	Form of final attestation: Test: semester 7
incl:		
contact work	32	
self-study	76	
practical training	0	
control hours	0	

Hours distribution:

Semester:	7
Type of classes	Hours
Contact hours	18
Practical training	14
Laboratory work	
Total contact hours	32
Self-study	76
Control hours	0
Total academic hours	108
Total credits	3

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1. LEARNING OBJECTIVES

Objective:	Formation of a system of fundamental theoretical knowledge, skills in the field of business analytics, methodology for using the results of data analysis in the formation of an organization's strategy, methods of statistical and intellectual data analysis in order to extract information and generate knowledge that increase the business value of the organization.
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2. COURSE PLACE IN THE PROGRAM STRUCTURE

The discipline B1.V Business Analytics is a part of Block 1.

3. EXPECTED LEARNING OUTCOMES

Code and name of graduate competence	Code and name of the competence achievement indicator	Expected learning outcomes
PC-4 – Development of a business strategy	PC-4.3 – Able to initiate the formation of patent applications for new technologies created within products, research of technologies, products and organizations existing on the market as potential assets for acquisition, formation of proposals for the acquisition of third-party assets attractive for the goals and interests of the organization, analysis of the business efficiency of the organization's existing assets	<p>To know: basics of statistical data analysis, econometric modeling, factor analysis; factors of economic efficiency and business value of the organization.</p> <p>To be able to: apply the results of statistical and intellectual data analysis in the formation of the organization's strategy; evaluate the feasibility of acquiring a technology or product based on available data; identify and evaluate the influence of factors that make up the business value of the organization.</p> <p>To possess: methods of statistical and intellectual data analysis; methods of strategic analysis of the organization's business value.</p>

4. COURSE STRUCTURE AND CONTENT

Code and name of the topics	Course content	Academic hours			
		Contact work			Self-study
		Lectures	Practices	Workshops	
Section I. Introduction to Business Intelligence					
Topic 1. Introduction to business analytics. The main directions of business analytics’	Business Analytics Knowledge Area. The concept of business analytics and related terms (business analysis, business intelligence). Tasks of business analytics. The main types and directions of business	2			2

development. The role of business intelligence in the activities of organizations.	analytics' development. Modern aspects of business analytics' development, the impact of digitalization. The role of business analytics in the activities of organizations. Business analytics outcomes in creating organizational value.				
Topic 2. Strategic decisions. Projection of decisions made on data. Methods of strategic analysis.	Business analytics as a basis for successful strategic decisions. Strategy and strategic decisions in the organization. Projection of the adopted strategic decisions on information support. Relationship between strategy and tactics. Balanced Scorecard. Methods of strategic analysis.	2	2		4
Section II. Fundamentals of statistical data analysis in business intelligence.					
Topic 3. Confidence intervals, samples. Testing statistical hypotheses.	Statistical foundations of successful business intelligence. Types of data. Distribution and its visualization. The concept of sampling. Sampling in market research and organizational performance. Extending the results and conclusions drawn from sample measurements to the general population. Testing statistical hypotheses.	2	2		8
Topic 4. Relationship analysis.	The concept of the relationship of factors. Cause and effect in the analysis of the organization activity. Visualization of the relationship of two factors, scatterplot. Correlation analysis. Pair and multiple regression model. Linear and non-linear dependencies. Selecting variables to include in the model. Multicollinearity. Dispersion analysis. Interpretation of the analysis' results. Forecasting.	2	2		8
Topic 5. Time series analysis.	The concept of a time series. The dependence of a factor on its state in the past. Autoregression. Analysis of trends and seasonality. Modeling cyclic behavior using ARIMA models. Visualization of results. Interpretation of results. Forecasting.	2			9
Section III. Big Data Analytics.					
Topic 6. Big Data. Organization of storage. Big data analytics.	The concept of Big Data. Features of Big Data. Multidimensionality of Big Data. Storage of Big Data. NOSQL databases. Distributed Computing. Basic methods of Big Data analysis. Cross-industry standard data mining process. The main directions of development of Big Data analytics.	2			6
Topic 7. Methods of data mining.	The role of data mining in business analytics. The concept of Data Science, Data Analytics, Machine Learning, Artificial Intelligence. Classification of data mining methods. Typical machine learning tasks in solving business intelligence problems. Problems of regression, classification, clustering, search for rules, dimensionality reduction. General concept of deep machine learning and scope in business analytics. Application in forecasting.	2	2		10
Section IV. Information systems in business analytics.					
Topic 8. Modern possibilities of data visualization. OLAP. MS BI.	Modern data visualization capabilities. Multidimensional databases. OLAP technologies in data analysis and visualization. Demonstration of the capabilities of MS Azure ML Studio (or analogues). Application of the package for solving typical problems of regression, clustering. SQL capabilities in MS Azure ML Studio. Learning	2	2		13

	opportunities in MS Azure ML Studio.				
Topic 9. Big Data software packages.	General information about the Python language. Sample code templates for data analysis. Loading data, pre-processing data, filling in missing values, creating new variables. Demonstration of the possibilities of using Python libraries in solving business analytics problems. Separation into test, working and validation samples. Building multiple models. Evaluation of the quality of the constructed models.	2	4		16
Control hours:					0
Total hours:		18	14	0	76

5. TEACHING AND LEARNING TOOLS OF THE COURSE

5.1 Recommended literature

Bibliographic description of the publication (author, title, type, place and year of publication, number of pages)	Digital resources
Borodin, A.I., Vygodchikova I.Yu., Gorsky M.A. Optimization methods in economics and finance: a textbook for universities. - Moscow: Yurayt Publishing House, 2022. - 157 p. - (Higher education). — ISBN 978-5-534-15218-0. — Text: electronic // Educational platform Urayt [website]. — URL: https://urait.ru/bcode/487944 (date of access: 12/04/2022). Series	https://urait.ru/bcode/487944
Kazakova, N. A. Modern strategic analysis: textbook and workshop for universities / N. A. Kazakova. - 3rd ed., revised. and additional - Moscow: Yurayt Publishing House, 2022. - 469 p. - (Higher education). - ISBN 978-5-534-11138-5. — Text: electronic // Educational platform Urayt [website]. — URL: https://urait.ru/bcode/489287 (date of access: 12/04/2022).	https://urait.ru/bcode/489287
Data analysis: a textbook for universities / V. S. Mkhitarian [and others]; edited by V. S. Mkhitarian. - Moscow: Yurayt Publishing House, 2022. - 490 p. - (Higher education). - ISBN 978-5-534-00616-2. — Text: electronic // Educational platform Urayt [website]. — URL: https://urait.ru/bcode/489100 (date of access: 12/04/2022).	https://urait.ru/bcode/489100
Garmash, A. N., Orlova I. V., Fedoseev V. V. Economic and mathematical methods and applied models: a textbook for undergraduate and graduate students; edited by V. V. Fedoseev. - 4th ed., revised. and additional - Moscow: Yurayt Publishing House, 2022. - 328 p. — (Bachelor and Master. Academic course). — ISBN 978-5-9916-3698-8. — Text: electronic // Educational platform Urayt [website]. — URL: https://urait.ru/bcode/507819 (date of access: 12/04/2022). Series	https://urait.ru/bcode/507819
Business statistics: textbook and workshop for universities / I. I. Eliseeva [and others]; edited by I. I. Eliseeva. - 2nd ed., revised. and additional - Moscow: Yurayt Publishing House, 2022. - 444 p. - (Higher education). - ISBN 978-5-534-14822-0. — Text: electronic // Educational platform Urayt [website]. — URL: https://urait.ru/bcode/490172 (date of access: 12/04/2022).	https://urait.ru/bcode/490172

5.2 List of software (including national production)

- 7-Zip
- LibreOffice

- ОС АЛЪТ образование 10
- Anaconda Individual Edition

5.3 List of reference systems and modern professional databases

№	Name of reference systems and professional databases
1.	Digital library Grebennikon.ru – www.grebennikon.ru
2.	Science Digital Library eLIBRARY – www.elibrary.ru
3.	Science Digital Library КиберЛеника – www.cyberleninka.ru
4.	Database ПОЛПРЕД Справочники – www.polpred.com
5.	Database OECD Books, Papers & Statistics on the platform OECD iLibrary www.oecd-ilibrary.org
6.	Legal reference system КонсультантПлюс (installed resource UNECON or www.consultant.ru)
7.	Legal reference system «ГАРАНТ» (installed resource UNECON or www.garant.ru)
8.	Information and referral system «Кодекс» (installed resource UNECON or www.kodeks.ru)
9.	Digital library system BOOK.ru - www.book.ru
10.	Digital library system ЭБС ЮРАЙТ – www.urait.ru
11.	Digital library system ЗНАНИУМ (ZNANIUM) – www.znanium.com
12.	Digital library UNECON – opac.unecon.ru

6. TECHNICAL FACILITIES

There are special rooms for lectures, seminars, coursework, group and individual consultations, current and interim assessments, as well as rooms for self-study.

The premises are equipped with equipment and teaching aids.

The rooms for students' independent work are equipped with computers with Internet connection and access to the university's electronic learning environment.

Name of classroom	Classroom location
Classroom 2009 Training classroom (for lecture- and seminar-type classes, coursework, group and individual consultations, current control and intermediate attestation), equipped with a multimedia system. Special furniture and equipment: Educational furniture for 122 seats (study table 61 pcs., chairs 122 pcs.), the teacher's workplace, desk m/m, drawer 1 pc, chalk board 1 pc (3 sections), chair 1 pc, drawer 1 pc, chair 1 pc, Chair 2 pcs., Intel i3-2100 2.4 Ghz /4Gb/500Gb/Acer V193 19" - 1 pc, Sound projector Yamaha YSP-3000 - 1 pc, Projector stand with camera decks - 1 pc, Projection screen draper - 1 pc, Multimedia projector Type 2 Panasonic PT-VX610E - 1 pc, Screen Media D1 ceiling bracket - 1 pc. Sets of display equipment and visual aids: multimedia applications for lecture courses and practical sessions, interactive teaching and visual aids.	191023, St. Petersburg, Griboedova canal, 30-32, lit. A, B, P
Classroom 2011 Training classroom (for lecture- and seminar-type classes, coursework, group and individual consultations, current control and intermediate attestation), equipped with a multimedia system. Specialized furniture and equipment: Educational furniture for 118 seats, teacher's workplace, desk - 1 pc, chalk board (3 sections) - 1 pc, marker board - 1 pc, desk - 1 pc, desk - 1 pc, drawer - 1 pc, chair - 3 pcs., Computer Intel i3-2100 2.4 Ghz /4Gb/500Gb/Acer V193 19" - 1 pc, ScreenMedia Champion 244x183cm SCM-4304 - 1 pc, Panasonic PT-VX610E multimedia projector - 1 pc. Sets of display equipment and visual aids: multimedia applications for lecture courses and practical sessions, interactive teaching and	191023, St. Petersburg, Griboedova canal, 30-32, lit. A, B, P

visual aids.	
Classroom 2028 Training classroom (for lecture- and seminar-type classes, coursework, group and individual consultations, current control and intermediate attestation), equipped with a multimedia system. Specialized furniture and equipment: Educational furniture for 44 seats, teacher's workplace, chalk board (one section) - 1 pc, chair - 1 pc, table - 1 pc, chair - 3 pcs. Portable multimedia set: HP 250 G6 1WY58EA laptop, LG PF1500G multimedia projector. Sets of display equipment and visual aids: multimedia applications for lecture courses and practical sessions, interactive teaching and visual aids.	191023, St. Petersburg, Griboedova canal, 30-32, lit. A, Б, P
Classroom 2045 Training classroom (for lecture- and seminar-type classes, coursework, group and individual consultations, current control and intermediate attestation), equipped with a multimedia system. Specialized furniture and equipment: Educational furniture for 78 seats, teacher's workplace, chalk board (3 sections) - 1 pc, chair - 1 pc, chairs - 2 pcs. Portable multimedia set: HP 250 G6 1WY58EA laptop, LG PF1500G multimedia projector. Sets of display equipment and visual aids: multimedia applications for lecture courses and practical sessions, interactive teaching and visual aids.	191023, St. Petersburg, Griboedova canal, 30-32, lit. A, Б, P
Classroom 2052 Training classroom (for lecture- and seminar-type classes, coursework, group and individual consultations, current control and intermediate attestation), equipped with a multimedia system. Specialized furniture and equipment: Educational furniture for 88 seats, teacher's workplace, chalk board (3 sections) - 1 pc, desk - 1 pc, table - 2 pcs, chair - 2 pcs, Computer Intel i3-2100 2.4 Ghz/500/4/Acer V193 19" - 1 pc, Multimedia projector Type 2 Panasonic PT-VX610E - 1 pc, ScreenMedia Champion 244x183cm SCM-4304 motorized screen - 1 pc, MW Cinerollo 200*200cm manual spring loaded screen - 1 pc, Multimedia projector Type 2 Panasonic PT-VX610E - 1 pc. Sets of display equipment and visual aids: multimedia applications for lecture courses and practical sessions, interactive teaching and visual aids.	191023, St. Petersburg, Griboedova canal, 30-32, lit. A, Б, P
Classroom 2060 Training classroom (for lecture- and seminar-type classes, coursework, group and individual consultations, current control and intermediate attestation), equipped with a multimedia system. Specialized furniture and equipment: Educational furniture for 82 seats, a teacher's workplace, chalk board (3 sections) - 1 pc., chair - 1 pc., table - 1 pc., chair - 2 pcs., Computer Intel i3-2100 2.4 Ghz/500/4/Acer V193 19" - 1 pc., Multimedia projector Panasonic PT-VX610E - 1 pc., Screen with electric drive ScreenMedia Champion 203x153cm (SCM-4303) - 1 pc. Sets of display equipment and visual aids: multimedia applications for lecture courses and practical sessions, interactive teaching and visual aids.	191023, St. Petersburg, Griboedova canal, 30-32, lit. A, Б, P
Classroom 2061 Training classroom (for lecture- and seminar-type classes, coursework, group and individual consultations, current control and intermediate attestation), equipped with a multimedia system. Specialized furniture and equipment: Educational furniture for 80 seats, teacher's workplace, table - 1 pc, chalk board (3 sections) - 1 pc, pulpit - 1 pc, chairs - 2 pcs. Portable multimedia set: HP 250 G6 1WY58EA laptop, LG PF1500G multimedia projector. Sets of display equipment and visual aids: multimedia applications for lecture courses and practical sessions, interactive teaching and visual aids.	191023, St. Petersburg, Griboedova canal, 30-32, lit. A, Б, P
Classroom 2023 Computer room (for practical classes, course design (coursework) using computer technology), equipped with a multimedia system. Specialized furniture and equipment: Educational furniture for 48 seats, teacher's workplace (computer desk - 1 pc.), wheeled marker board - 1 pc, 3 sectional marker board - 1 pc, desk - 1 pc, iso chair - 7 pcs, chair -1 pc, blinds - 3 pcs., Computer i5-8400/8GB/500GB_SSD/Viewsonic VA2410-mh -34 pcs, Switchboard Cisco Catalyst 2960-48PST-L (including SmartNet Service Contract CON-SNT-2964STL) - 1 pc, Wi-Fi Access Point Type1 UBIQUITI UAP-AC-PRO - 1 pc, NEC M350 X projector - 1 pc, Local Area Network Switch (48 ports) Cisco WS-C2960+48PST-L - 1 pc, ProCurve Switch 2626 - 1 pc, Intel pentium x2 g3250 computer /500gb / philips 21.5' monitor - 1 pc, Ubiquiti IP video camera - 1 pc, Wireless access point/UNI FI AP PRO/Ubiquiti - 1 pc. Sets of display equipment and visual aids: multimedia applications for lecture courses and practical sessions, interactive teaching and visual aids.	191023, St. Petersburg, Griboedova canal, 30-32, lit. A, Б, P

Classroom 2034 Computer room (for practical classes, course design (coursework) using computer technology), equipped with a multimedia system. Specialized furniture and equipment: Educational furniture for 25 seats, teacher's workplace (table 1pc., chair 1pc.), marker board 1pc, Rack hanger 2pcs, chairs 3pcs. Computer I5-7400/8Gb/1Tb/DELL S2218H - 21pcs, Network switch Cisco WS-C2960-48TT-L (Catalyst2960) 48-ports 10/100Mbps+2p - 1 pc, Switchboard Cisco Catalyst 2960 24 WS-C2960-24PC-L - 1 pc. Sets of display equipment and visual aids: multimedia applications for lecture courses and practical sessions, interactive teaching and visual aids.	191023, St. Petersburg, Griboedova canal, 30-32, lit. A, B, P
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7. METHODOLOGICAL GUIDELINES FOR STUDENTS

The following documents should be made available to the trainee before the start of the course:

- training and methodological documentation;
- local normative acts regulating the main issues of the organisation and implementation of educational activities, including those regulating the procedure for current monitoring and interim assessment of students;
- the schedule of consultations of the teaching staff.

The level and depth of mastering the discipline is determined by the active and systematic work of students in lectures, seminars, independent work, including in terms of identifying the most significant and relevant problems for further study. A special condition for qualitative mastering of the discipline is an effective organisation of work, which allows distributing the academic workload evenly in accordance with the schedule of the educational process.

When preparing for classes, students have the opportunity to attend consultations with the staff of UNECON according to the timetable set out in the schedule of consultations.

The students' in- and out-of-classroom work should aim to form:

- the fundamentals of the learner's world view and scientific understanding;
- basic knowledge relevant to the training area and the declared professional field, forming the target and professional basis for training;
- professional competences oriented towards the needs of the labour market;
- an individual trajectory by mastering a unique set of professional competences that complement the learner's competence model, through a focus on specific professional specialised areas of knowledge defined by labour market representatives;
- meta-skills for learners, such as teamwork and leadership, data analysis, digital skills, project design and implementation, intercultural interaction.

8. SPECIFICATIONS FOR TEACHING DISABLED PERSONS

Students with disabilities, if necessary, are taught on the basis of an adapted work program using special teaching methods and didactic materials that take into account the particularities of their psychophysical development, individual capacities and health status.

In order for disabled persons and persons with disabilities to master the curriculum, the University shall ensure that:

- for the visually impaired and visually impaired: availability of information on the timetable in accessible places and adapted forms for learners who are blind or visually impaired; presence of an assistant to assist the learner as needed; production of alternative formats of teaching materials (large print or audio files);

- for the hearing-impaired and hearing-impaired: adequate sound reproduction of information;

- for persons with disabilities and persons with mobility impairments: the possibility of unimpeded access for students to classrooms, restrooms and other areas of the department, as well as their stay in these areas.

Learners with disabilities and persons with disabilities are provided with printed and/or electronic educational resources in forms adapted to their disabilities. The education of students with disabilities may be organised with other students or in separate groups or organisations.

ASSESSMENT RESOURCES

1.1 Control tasks and assignments for interim attestation

Is not provided by the work programme of the discipline.

1.2 Topics for written task

Is not provided by the work programme of the discipline.

1.3 Interim checkpoints

Number	Type	Method of conduct	Topic number
1	Design and analytical work	usage of technical means and information systems	1-3
2	Design and analytical work	usage of technical means and information systems	3-5
3	Monitoring	usage of technical means and information systems	1-9

1.4 Other assessment objects

Is not provided by the work programme of the discipline.

1.5 Self-study

Name of self-study	Topic number
Preparation for lectures and practical classes	1-9
Preparation of messages, reports	1, 2, 7, 8
Solving professional problems	3-6

1.6 Grading scale

Scales of assessment and procedures for assessing learning outcomes of the discipline are regulated by the Regulations on the current control of progress and interim attestation of students in higher education programs and the Regulations on the scoring and rating system.

A grading and rating system is used to assess the learning outcomes of the discipline:

The final control of the discipline is an examination (or a differentiated test), the final grade being formed in accordance with the scale given in the table below:

Points	Grade
<55	Not passed
>=55	Passed

Grading scale

2 (points to 54)	Demonstrates a lack of understanding of the problem. Many of the requirements of the assignment are not met. An initial perception of the material is demonstrated. The work is incomplete and/or plagiarised.
3 (points 55-69)	Demonstrates a partial understanding of the problem. Most of the requirements of the task have been met. Mastery of the elements of the assigned material. The material is mostly clear and coherent.
4 (points 70-84)	Demonstrates considerable understanding of the issue by the discipline. All requirements of the assignment are fulfilled. The content of the completed tasks is disclosed and examined from different perspectives.
5 (points 85-100)	Demonstrates full understanding of the problem. All requirements of the assignment are fulfilled. Demonstrates proficiency in the discipline. The completed assignments are holistic, complete, structured, present different points of view and demonstrate creativity.