



## Business Statistics

### Syllabus

### III 2.8

### STAT-221

### Specialty: 292 “International Economic Relations” Educational program “International Business”

Quarter/Year: Fall /2023

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ECTS Credits: 6

US Credits: 3

**Prerequisites: Mathematics for Economics**

### Course Description

Business Statistics is a way of thinking that can help make better decisions that are based on data that have been collected. In the current data-driven environment of business it is important to have skills that allow to manipulate data, interpret analytical results, and incorporate results in a variety of decision-making applications. Business statistics focuses on interpreting the results of applying the methods, that allow to work with data effectively. Descriptive statistics is the art of summarizing data. Topics include: histograms, the average, the standard deviation, the normal curve, correlation. Much statistical reasoning depends on the theory of probability. Topics include: expected value, standard error, probability distributions, convergence to the normal curve. Statistical inference is the art of making valid generalizations from samples. Topics include: estimation, tests of statistical significance.

The course discusses the basic concepts of data analysis and statistical computing. Topics covered include basic descriptive measures, probability theory, confidence intervals, and hypothesis testing.

The main objective is to teach students how to think critically about data – how they were collected and analyzed – and their uses in the business activities, such as

- summarize and visualize business data,
- reach conclusions from those data,
- make reliable forecasts about business activities,
- improve business processes,

and to prepare students for future courses having quantitative components.

### Course Outcomes

Upon successful completion of this course, students will be able to:

PH3. Use modern information and communication technologies, software packages for general and special purposes.

PH4. Systematize and streamline the information received on the processes and phenomena in the world economy; evaluate and explain the influence of endogenous and exogenous factors on them; formulate conclusions and develop recommendations, considering the peculiarities of the national and international environment.

PH7. Apply the acquired theoretical knowledge to solve practical problems and meaningfully interpret the results.

PH8. Understand, highlight and describe new phenomena, processes and trends of global development, mechanisms and tools for the implementation of economic policy and world integration / disintegration processes, including Euro-Atlantic integration.

PH9. Understand and be able to apply, in accordance with other requirements of the educational program, modern theories and methods of solving specialized complex problems and practical problems in the field of international trade in goods and services, international capital flow, international monetary and financial relations, mobility of human resources, international technology transfer.

PH10. Identify and highlight the features of the functioning of the subjects of international relations and models of their economic development.

PH11. Substantiate own opinion regarding the specific conditions for the implementation of forms of international economic relations at the mega-, macro-, meso- and micro-levels.

PH12. Carry out a comprehensive analysis of complex economic systems, compare and contrast their components, evaluate and justify evaluations of the effectiveness of their functioning.

PH13. Select and skillfully apply analytical tools for studying the state and development prospects of individual segments of the international markets for goods and services using modern knowledge about the methods, forms and tools for regulating international trade.

PH14. Understand and apply theories, principles, means and tools for the implementation of international monetary and financial and credit relations.

PH15. Determine the functional features, nature, level and degree of interconnections between subjects of international economic relations of different levels and establish communications between them.

PH16. Demonstrate knowledge about the state of research in international economic relations and the world economy in an interdisciplinary combination with political, legal, natural sciences.

PH18. Investigate economic phenomena and processes in the international sphere based on an understanding of categories, laws; highlighting and summarizing trends, patterns of functioning and development of the world economy, taking into account the cause-effect and space-time relationships.

PH19. Understand and apply current legislation, international regulations and agreements, reference materials, current standards and specifications, etc. in the field of international economic relations.

PH22. Apply appropriate methods, rules and principles of functioning of international economic relations for the development of foreign economic activity of Ukraine.

PH23. Recognize the need for lifelong learning in order to maintain a high level of professional competence.

PH24. Substantiate the choice and apply information and analytical tools, economic and statistical calculation methods, complex analysis techniques and methods of monitoring world markets.

PH25. Present the results of the research on the basis of which recommendations and measures for adaptation to changes in the international environment are developed.

## **Competencies**

IK. The ability to solve complex specialized tasks and practical problems in the field of international relations in general and international economic, in particular, as well as in the learning process, which involves the use of new theories and methods in conducting comprehensive research of world economic relations, is characterized by complexity and uncertainty.

3K8. Ability to abstract thinking, analysis and synthesis.

3K7. Skills of using information and communication technologies.

CK3. Ability to identify features of the functioning of the environment of international economic relations and models of economic development.

CK11. Ability to conduct research on economic phenomena and processes in the international sphere, taking into account causal and spatio-temporal relationships.

## **Internationality:**

The international aspect of the course includes adherence to the international standards in educational process, using American textbooks and support materials, considering examples of actual economic problems such as: Case Study 1/ The Consumer Price Index; Case Study 2/ Monitoring the Unemployment Rate; Case Study 3/ Monitoring other important economic indicators using modern international [Data Science Resources](#) for developing best practices in statistics.

## **Communications**

For individual issues, students should contact the professor **ONLY** by given e-mail or by Moodle. In the Subject line they should put: **UACUFirstNameLastName**. E-mail messages will normally be answered within 24 hours.

Note! Only emails sent from the student's corporate email address will be answered.

Attention! Official and only language used for assessment activities is English. Official and only languages used for communication within the University are Ukrainian and English.

## **Student Responsibilities**

### **Time Commitment**

The study of technical courses is cumulative (i.e., an understanding of earlier material is necessary to grasp concepts covered later). Past experience has shown a high correlation between procrastination and low grades. Students must be committed to completing tasks on time.

## **Technical Aspects**

The student is obliged to provide himself/herself with all the necessary technical equipment for the educational process (laptop or computer, webcam, headsets or headphones and microphone), as well as access to the Internet.

Only students signed-in with their own first and last name are allowed into [video](#) lectures in Zoom.

## **Grading Policy**

The course is based on mastery of course outcomes. The student's grade for this course will be calculated based on performance.

**Note:** the minimal grade to pass a subject is **60%**.

### Graduate Grading Guidelines

The assignment of a letter grade for a course is an indication of the student's overall success in achieving the learning outcomes for the course. The course letter grade may be viewed as a summary statement of the student's achievement in individual assessments (assignments & activities). These assessments are intended to identify for students their strengths as well as those areas in need of improvement. Student work is assessed according to the guidelines below.

### Course-level Grading guidelines:

Grade	ECTS Grade	International Grade
90% - 100%	A	5 (Excellent)
83% - 89%	B	4 (Very Good)
75% - 82%	C	4 (Good)
70% - 74%	D	3 (Good)
60% - 69%	E	3 (Acceptable)
35% - 59%	FX	Not acceptable, possible repetition of course

### Criteria for grading:

ECTS grade	Requirements for the student
A	The student demonstrated a comprehensive systemic and in-depth knowledge of program material; processed basic and additional literature; obtained a solid grasp of the conceptual apparatus, methods, techniques and tools provided by the program; found creative abilities in the presentation of the educational program material both on this issue and on related modules of the course and related courses, or the student had a current control of 90-100 points
B	The student demonstrated good knowledge of program material; processed the basic literature, mastered the conceptual apparatus, methods, techniques and tools provided by the program, but with some inaccuracies
C	
D	The student showed mediocre knowledge of the core program material; learned information mainly from a lecture course or just one textbook; mastered only certain methods, techniques and tools provided by the program
E	
FX	The student has significant gaps in knowledge of the main program material; fragmentary mastered the basic concepts, techniques and tools; significant mistakes are made when using them

Maximum total possible points - **500** points incl. (midterm and final exam are **60%** of overall evaluation, where Midterm – **20%** and Final – **40%**)

Test / Class Assignment – **25** points (2 times during the course)

Homework Assignment – **15** points (3 times during the course)

Quiz – **15** points (4 times during the course)

Problem Solving Activity in Class (total possible **45** points)

Midterm exam - **100** points

Final exam - **200** points

### **Student Workload**

It is assumed that for each out of 17 class sessions a student spends about 10.5 academic hours of work. This includes 3.5 academic hours of lectures with the instructor and 7 academic hours of personal work. Personal work includes reviewing lectures, doing homeworks, preparing for tests, quizzes using recommended materials.

Please pay attention that 1 academic hour equals to 40 minutes.

#### **Assignment Format**

- All work should be shown in time. If the student misses the deadline – the task is failed.
- There are 4 quizzes (**15 points each**) that a student will take during the lessons, total **12%**.
- Two Tests/Class Assignments should be done with books closed to help student practice, learn and better understand statistical skills, total **10%**.
- Three Homework Assignments (**15 points each**), total 9%.

These assignments will consist of: (1) a set of exercises at the end of each chapter, and (2) analysis of real datasets downloaded by the students and approved by the instructor. For the **data** analysis section, students will be required to submit an Excel file.

- Problem Solving Activity in Class (**5 points each class**), total 9%.
- Midterm covers topics from previous lectures (weeks 1-7). It includes multiple choice questions and cases and takes about **1.5** hour.
- The final exam covers all course material and includes multiple choice questions. It lasts for **2** hours. Admission to the final exam is possible only if all the tasks of the curriculum are covered.
- After the Midterm and Final is graded a student has access to the grade only. Access to the attempt, corrects answers and information whether the answer is correct cannot be granted.

#### **Academic dishonesty**

Academic integrity is submitting one's own work and properly acknowledging the contributions of others. Forms of academic dishonesty include:

1. Plagiarism – submitting all or part of another's work as one's own in an academic exercise such as an examination, a computer program, or written assignment.
2. Cheating – using or attempting to use unauthorized materials on an examination or assignment, such as using unauthorized texts or notes or improperly obtaining (or attempting to obtain) copies of an examination or answers to an examination. Including the use of artificial intelligence and pre-prepared answers to the questions of tasks is prohibited (unless otherwise specified in the task itself or allowed by the instructor).
3. Facilitating Academic Dishonesty – helping another commit an act of dishonesty, such as substituting for an examination or completing an assignment for someone else.
4. Fabrication – altering or transmitting, without authorization, academic information or records.

Any violation of these rules constitutes academic dishonesty and is liable to result in a failing grade and disciplinary action. In case of any academic dishonesty a student is not allowed to continue or retake the assessment activity and for the Final the unsatisfactory grade (“0”) is assigned for the course total. Cases of the academic dishonesty are not considered by the Academic Council.

Midterm and Final are valid only if they are taken on-campus (room defined by the dean's office) and on UACU's computer/laptop or online on the student's computer/laptop using Zoom and other conditions defined by the dean's office to avoid the cases of academic dishonesty. Students who will not meet this requirement will be expelled from the course with grade "0".

In case of missed Midterm or Final exam (for a valid reason like sickness or an emergency) a request to repeat the exam is possible. Permit to repeat a midterm or final exam is done through a letter to the dean's office with request and approval of subject lecturer. Submission or retaking of any assessment activities after deadlines are forbidden.

### Submission & Return Policy

Assignments must be submitted to the professor on or before the due date indicated in the Course Schedule. The assignments submitted after the due dates receive zero points.

\*\*\*\* NO MAKE –UP QUIZZES AND EXAMS \*\*\*\*

#### Schedule

Lecture #	Research Projects	Assignments Due	Points (for each assessment activity)
Topic 1.	<b>Introduction to Business Statistics</b> Business Statistics: What is it? Descriptive and Inferential Statistics. The elements of Business Statistics. Types of <b>Data</b> : Nominal, Ordinal, Interval/Ratio.	Review Lecture Quiz	<u>  15  </u>
Topic 2.	<b>Descriptive Statistics: Graphical Methods for Describing Data</b> Frequency Distribution and Relative Frequency Distributions. Graphical Methods for displaying of Numerical <b>Data</b> : Histograms and Stem-and-Leaf Displays.	Review Lecture Class Problem Solving Activity	<u>  5  </u>
Topic 3.	<b>Descriptive Statistics: Numerical Methods for Describing Data</b> Population Mean, Sample Mean, Properties of the Arithmetic Mean, Median, Mode	Review Lecture Quiz	<u>  15  </u>
Topic 4.	<b>Numerical Methods for Measuring Variability</b> Measures of Dispersion, Variance and Standard Deviation, Quartiles, Deciles, Percentiles, Computer Commands: Excel.	Review Lecture Test / Class Assignment	<u>  25  </u>
Topic 5.	<b>Probability: Basic Concepts and Theorems of Probability Theory</b> Events, Sample Space and Probability,	Review Lecture Class Problem Solving Activity	<u>  5  </u>

	Additive Rule and Mutually Exclusive Events, Complementary Events.	Homework Assignment	<u>  15  </u>
<b>Topic 6.</b>	<b>Probability: Conditional Probability and Bayes' Theorem</b> Dependent and Independent Events, Conditional Probability, Multiplication Rule, Bayes' Theorem.	Review Lecture Class Problem Solving Activity	<u>  5  </u>
<b>Topic 7.</b>	<b>Random Variables and Discrete Probability Distributions</b> Two types of Random Variables, Mean, Variance and Standard Deviation of a Probability Distribution, Binomial Probability Distribution, Hypergeometric Probability Distribution, Poisson Probability Distribution	Review Lecture Homework Assignment Class Problem Solving Activity	<u>  15  </u> <u>  5  </u>
	<b>Midterm (20% out of total amount of points for the course )</b>		<u> 100 </u>
<b>Topic 8.</b>	<b>The Normal Probability Distribution</b> Family of Normal Probability Distributions with different Means and Standard Deviations, Standard Normal Probability Distribution, Computing Probabilities for z-Scores	Review Lecture Quiz	<u>  15  </u>
<b>Topic 9.</b>	<b>Sampling Methods</b> Sampling the Population, Distribution of Sample Mean	Review Lecture Class Problem Solving Activity	<u>  5  </u>
<b>Topic 10.</b>	<b>Central Limit Theorem</b> Standard Error of the Mean, Computing Probabilities for z-Scores	Review Lecture Quiz	<u>  15  </u>
<b>Topic 11.</b>	<b>Confidence Intervals</b> a brie Point Estimates of Parameters, Confidence Intervals	Review Lecture Class Problem Solving Activity	<u>  5  </u>
<b>Topic 12.</b>	<b>One-Sample Tests of Hypothesis</b> Null and Alternative Hypotheses, One-Tailed and Two-Tailed Tests of Significance, Type I and Type II Errors Hypothesis Testing	Review Lecture Test / Class Assignment	<u>  25  </u>
<b>Topic 13.</b>	<b>Two-Sample Tests of Hypothesis</b> Hypothesis Testing: Population Means, Tests about Proportions, Dependent Samples	Review Lecture Class Problem Solving Activity Homework Assignment	<u>  5  </u> <u>  15  </u>

<b>Topic 14.</b>	<b>Correlation Analysis</b> Coefficient of Correlation, Coefficient of Determination, Testing the Significance of the Correlation Coefficient	Review Lecture Class Problem Solving Activity	<u>  5  </u>
<b>Topic 15.</b>	<b>Regression Analysis</b> Least Squared Method, Line of Regression, Standard Error of Estimate	Review Lecture Class Problem Solving Activity	<u>  5  </u>
	<b>Final (40% out of total amount of points for the course)</b>		<u> 200 </u>

### Recommended Materials

- 1) James T. McClave, P George Benson “Statistics for Business and Economics”, 14th edition, 2022.
- 2) D. Lind, W. Marchal, S. Wathen “Statistical Techniques in Business and Economics”, Eighteenth Edition, 2021.
- 3) Robert A. Stine, Dean Foster Statistics for Business: Decision Making and Analysis, 3rd edition, 2021.
- 4) David M. Levine, David F. Stephan, Kathryn A. Szabat “Business Statistics: A First Course”, 8th Edition, 2020.
- 5) P. Newbold, W. L. Carlson, B. M. Thorn “Statistics for Business and Economics”, Global Edition, 2013.

### Internet links

- 1) <https://www.khanacademy.org/math/ap-statistics> (for straightforward explanations of statistical terms and concepts)
- 2) <https://stattrek.com/tutorials/ap-statistics-tutorial.aspx>
- 3) <https://www.statista.com/> (statistics portal for market data, market research and market studies)

*\* The above schedule and procedures are subject to change in the event of extenuating circumstances.*

Протокол засідання кафедр № 4 від 22.08.2023 року

Проректор з навчально-методичної роботи

Завідувач кафедри

Викладач

Л.І.Кондратенко

Л.В.Жарова

Ю.А.Гладка