



STATISTICS

Syllabus

III 2.8

Specialty: 073 “Management”

Educational program “Management”

Quarter/Year: Spring / 2022

Instructors: Yuliya Gladka, Ph.D

ECTS Credits: 6

US Credits: 3

Contact information:

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Prerequisites: Mathematics for Economics

Course Description

Statistics is the art of using data to make wise decisions in the face of uncertainty. 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, measures of association, 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 analysed—and their uses in different statistical analyses, to prepare students for future courses having quantitative components.

Course Outcomes

PH3. Demonstrate knowledge of theories, methods and functions of management, modern concepts of leadership.

PH4. Demonstrate skills to identify problems and justify management decisions.

PH5. Describe the content of the functional areas of the organization.

PH6. Identify skills of search, collection and analysis of information, calculation of indicators to justify management decisions.

PH8. Apply management methods to ensure the effectiveness of the organization.

PH11. Demonstrate skills of situation analysis and communication in various areas of the organization.

PH12. Assess the legal, social and economic consequences of the organization.

PH13. Communicate orally and in writing in state and foreign languages.

PH15. Demonstrate the ability to act socially responsibly and socially consciously on the basis of ethical considerations (motives), respect for diversity and interculturalism.

PH17. Perform research individually and/or in a group under the guidance of a leader.

Competencies

3K3. Ability to abstract thinking, analysis, synthesis.

3K4. Ability to apply knowledge in practical situations.

3K8. Skills in the use of information and communication technologies.

CK6. The ability to act socially responsibly and consciously.

CK10. Ability to evaluate the work performed, ensure their quality and motivate the staff of the organization.

CK11. Ability to create and organize effective communications in the management process.

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: **UACUFirstName LastName**. E-mail messages will normally be answered within 24 hours.

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

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 hour.

The final exam covers all course material and includes multiple choice questions. It lasts for 1.5 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. Any violation of this principle constitutes academic dishonesty and is liable to result in a failing grade and disciplinary action. Forms of academic dishonesty include:

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.

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.

Facilitating Academic Dishonesty – helping another commit an act of dishonesty, such as substituting for an examination or completing an assignment for someone else.

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 retaken 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 |
|-----------|---|---|---------|
| Lecture 1 | Topic 1. Introduction to Statistics Statistics: What is it? Descriptive and Inferential Statistics. The elements of Statistics. Types of Data: Nominal, Ordinal, Interval/Ratio. | Review Lecture Quiz | 15 |
| Lecture 2 | Topic 2. Descriptive Statistics: Graphical Methods for Describing Data Frequency Distribution and Relative Frequency Distributions. Graphical Methods for displaying of Numerical Data : Histograms and Stem-and-Leaf Displays. | Review Lecture Class Problem Solving Activity | 5 |
| Lecture 3 | Topic 3. Descriptive Statistics: Numerical Methods for Describing Data Population Mean, Sample Mean, Properties of the Arithmetic Mean, Median, Mode | Review Lecture Quiz | 15 |
| Lecture 4 | Topic 4. Numerical Methods for Measuring Variability Measures of Dispersion, Variance and Standard Deviation, Quartiles, Deciles, Percentiles, Computer Commands: Excel. | Review Lecture Test / Class Assignment | 25 |
| Lecture 5 | Topic 5. Probability: Basic Concepts and Theorems of Probability Theory Events, Sample Space and Probability, Additive Rule and Mutually Exclusive Events, Complementary Events. | Review Lecture Class Problem Solving Activity Homework Assignment | 5 15 |

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|------------|--|---|------------|
| Lecture 6 | Topic 6. Probability: Conditional Probability and Bayes' Theorem Dependent and Independent Events, Conditional Probability, Multiplication Rule, Bayes' Theorem. | Review Lecture Class Problem Solving Activity | 5 |
| Lecture 7 | Topic 7. Random Variables and Discrete Probability Distributions 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 | 15 5 |
| Lecture 8 | Midterm (20% out of total amount of points for the course) | | 100 |
| Lecture 9 | Topic 8. The Normal Probability Distribution Family of Normal Probability Distributions with different Means and Standard Deviations, Standard Normal Probability Distribution, Computing Probabilities for z-Scores | Review Lecture Quiz | 15 |
| Lecture 10 | Topic 9. Sampling Methods Sampling the Population, Distribution of Sample Mean | Review Lecture Class Problem Solving Activity | 5 |
| Lecture 11 | Topic 10. Central Limit Theorem Standard Error of the Mean, Computing Probabilities for z-Scores | Review Lecture Quiz | 15 |
| Lecture 12 | Topic Topic 11. Confidence Intervals a brie Point Estimates of Parameters, Confidence Intervals | Review Lecture Class Problem Solving Activity | 5 |
| Lecture 13 | Topic Topic 12. One-Sample Tests of Hypothesis 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 | 25 |
| Lecture 14 | Topic 13. Two-Sample Tests of Hypothesis Hypothesis Testing: Population Means, Tests about Proportions, Dependent Samples | Review Lecture Class Problem Solving Activity Homework Assignment | 5 15 |
| Lecture 15 | Topic 14. Correlation Analysis Coefficient of Correlation, Coefficient of Determination, Testing the Significance of the Correlation Coefficient | Review Lecture Class Problem Solving Activity | 5 |
| Lecture 16 | Topic 15. Regression Analysis Least Squared Method, Line of Regression, Standard Error of Estimate | Review Lecture Class Problem Solving Activity | 5 |
| Lecture 17 | Final (40% out of total amount of points for the course) | | 200 |

Recommended Materials

D. Lind, W. Marchal, S. Wathen “Statistical Techniques in Business and Economics”, Eighteenth Edition, 2021.

Mark L. Berenson, David M. Levine, Kathryn A. Szabat “Basic Business Statistics. Concepts and Applications”, Fourteenth Edition, 2019.

P. Newbold, W. L. Carlson, B. M. Thorn “Statistics for Business and Economics”, Global Edition, 2013.

Moore, S. D., and McCabe, G. P. “Introduction to the Practice of Statistics”, Sixth Edition, Freeman Press, 2009.

D. Lind, W. Marchal, S. Wathen “Basic Statistics for Business and Economics”, 2000.

Internet links

<https://www.khanacademy.org/math/ap-statistics> (for straightforward explanations of statistical terms and concepts)

<https://stattrek.com/tutorials/ap-statistics-tutorial.aspx>

<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 № 1 від 22.01.2022 року

Проректор з навчально-методичної роботи



Л.І.Кондратенко

Завідувач кафедри



А.В.Кінаш

Викладач



Ю.А.Гладка