



## UNIVERSITY OF NEW YORK IN PRAGUE

**Course:** MTH201 Statistics I (6 ECTS)

**Semester:** Summer

**Prerequisites:** College Algebra

**Instructors:** Martin Hála

### 1. Course Purpose

This course focuses at first on graphical and numerical tools used in descriptive statistics. It introduces methods for detection possible relationship between variables, correlation and regression analysis. Later it introduces basic concepts of probability and continuous probability distributions, including normal distribution and its applications. Finally basic inference methods are introduced, namely theory of estimate and hypothesis testing.

The purpose of the course is to provide students with the knowledge and skills in order to assess statistical evidence reported in scientific and non-scientific papers. The course aims to teach the steps of the computation of basic descriptive and inferential statistical procedures needed to answer research questions. Generally, the course aims to motivate in students an intrinsic interest in statistical thinking, to instill the belief that statistics is important for scientific research, and provide a foundation and motivation for exposure to statistical ideas subsequent to the course.

### 2. Required Readings

- *Business Statistics*. Global Edition: David F. Groebner, Patrick W. Shannon, Phillip C. Fry  
<https://www.perlego.com/book/811081/business-statistics-global-edition-pdf>
- *Statistics for Managers Using Microsoft Excel*. Global Edition: David M. Levine, David F. Stephan, Kathryn A. Szabat  
<https://www.perlego.com/book/811045/statistics-for-managers-using-microsoft-excel-global-edition-pdf>

### 3. Additional Readings

- *Statistics for Psychology*. Pearson New International Edition. Arthur Aron, Elaine N. Aron, Elliot Coups, Cole Publishing Keller, G. (2012).  
<https://www.perlego.com/book/811045/statistics-for-managers-using-microsoft-excel-global-edition-pdf>
- *Business Statistics: A First Course*. Global Edition. David M. Levine, Kathryn A. Szabat, David F. Stephan  
<https://www.perlego.com/book/810887/business-statistics-a-first-course-global-edition-pdf>
- *Intro Stats*. Pearson New International Edition. Richard D. De Veaux, Paul F. Velleman, David E. Bock  
<https://www.perlego.com/book/812269/intro-stats-pearson-new-international-edition-pdf>

- *Introductory Statistics for the Behavioral Sciences*. Barry H. Cohen, Joan Welkowitz, R. Brooke Lea  
<https://perlego.com/book/1010583/introductory-statistics-for-the-behavioral-sciences-pdf>
- *Business Statistics for Dummies*. Alan Anderson  
<https://www.perlego.com/book/998612/business-statistics-for-dummies-pdf>

#### 4. Learning Outcomes

Upon the completion of this course, the students should be able to:

- distinguish between different types of data
- distinguish between a population and a sample, and between parameters and statistics
- assess which methods for summarizing a data set are most appropriate to highlight interesting features of the data
- use an appropriate software tool for data summary and exploratory data analysis
- identify a possible relationship in bivariate data from a scatterplot
- compute and interpret sample correlation coefficient
- fit a linear model to a bivariate data set via software
- interpret the coefficients of the regression model
- compute predictions based on the linear model, discuss its quality
- recall and apply rudimentary mathematical properties of probability
- recall the key properties of the Normal distribution
- use an appropriate software tool for finding normal probabilities and critical values
- explain the ideas of sampling distribution
- interpret a confidence interval and confidence level
- calculate interval estimates for the population mean and population proportion
- identify the components of a hypothesis test, including the parameter of interest, the null and alternative hypotheses and the test statistic
- perform statistical tests of the population mean and population proportion.

#### 5. Course Content

- Course introduction; basic concepts.
- Presenting data using graphs, charts, and tables; basic measures of location.
- Percentiles; measures of variation; Boxplot.
- Empirical rule; scatter diagrams; Pearson correlation.
- Introduction to simple linear regression.
- Applications of simple linear regression.
- Midterm exam.
- Introduction to probability.
- Conditional probability; independence of events.
- Continuous probability distributions; normal distribution.
- Applications of normal distribution; sampling distributions.
- Point and confidence interval estimate for the population mean and population proportion.
- Basic concepts of hypothesis testing; significance; Type I and Type II errors.
- Testing hypotheses about population mean and proportion; p-value approach.

## 6. Course Requirements and Grading

Assignments	20%
Quizzes	21%
Mid-term test	25%
<u>Final Exam</u>	<u>34%</u>
Total	100%

### Assignments (20 %)

Four assignments will be assigned during the semester. Two or three person teams will solve the problems using the case study method. The team will write a single paper. You will be sometimes asked to analyze large amounts of data; the use of a computer will be necessary.

### Quizzes (21 %)

There will be four online quizzes during the semester. They will be administered during the 4<sup>th</sup>, 6<sup>th</sup>, 10<sup>th</sup>, and 13<sup>th</sup> class meeting. Each quiz is worth for 7 points (= 7% of your final credit). The worst quiz does not count.

### Mid-term test (25 %)

This online exam will be administered during the 7<sup>th</sup> class meetings. It will consist of several problems covering the material discussed in the lectures during first six class meetings.

### Final Exam (34 %)

This cumulative exam will cover the material from the entire course. It will be administered during the last class meeting on Thursday, July 1.

### Grading Scale

Letter Grade	Percent (%)	Generally Accepted Meaning
A	95-100	Outstanding work
A-	90-94	
B+	87-89	Good work, distinctly above the average
B	83-86	
B-	80-82	
C+	77-79	Acceptable Work
C	73-76	
C-	70-72	
D+	67-69	Work that is significantly below average
D	63-66	
D-	60-62	
F	0-59	Work that does not meet the minimum standards for passing the course

## 7. Key UNYP Policies

### Academic Honesty

- The University's rules on academic dishonesty (e.g. cheating, plagiarism, submitting false information) will be strictly enforced. Please familiarize yourself with the STUDENT HONOUR CODE or ask your instructor for clarification.
- On written papers properly note your sources with academic citations. Cutting and pasting from the internet may be considered plagiarism. If you have questions about this, please consult the instructor.

## 8. General Requirements

- In the event of illness or emergency, contact your instructor IN ADVANCE to determine whether special arrangements are possible.
- **There are no make-ups for missed quizzes.**

## 9. European Credit Transfer and Accumulation System (ECTS)

The students that complete the course will receive 6 ECTS credits or 3 American credits. One ECTS credit corresponds to 25-30 hours of work. For comparison, 1 American credit hour equals approximately 2 ECTS credits.

For this course, students are expected to spend time in the following course-related activities:

Class Lectures and exams	45 hours
Reading class related material	45 hours
Mid-term test preparations	30 hours
Homework assignments – team work	25 hours
<u>Final exam preparation</u>	<u>25 hours</u>
TOTAL	170 hours

## 10. Technology Expectations

Regular use of Jamovi and Excel is required in the course.

**May 2021, Martin Hála**