

Course Syllabus

Business Statistics

Course code: MTH222/1

Term and year: Fall 2021

Day and time: Mondays, 14:45 - 17:30

Instructor: Doc Dr. Ivan Tomek

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| Credits US/ECTS | 3/6 | Level | Intermediate |
| Length | 15 weeks | Pre-requisite | MTH111 |
| Contact hours | 42 hours | Course type | Bachelor req CEA |

1. Course Description

This course provides a comprehensive review of why and how we use basic mathematical and statistical methods and stresses their practical applications.

The course will teach the students basic analytical skills and shows typical problems that arise in business.

The course includes practical, analytical and theoretical sections. The course focuses on statistical analysis of data starting with descriptive statistics, and introduces concepts as sampling, hypothesis testing, regression analysis, probabilities, etc. Thus, solid basis is built for immediate practical implementation and as well for more profound studies of quantitative analysis and formal manipulation with business data.

2. Student Learning Outcomes

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

- Understand the meaning and use of statistical terms used in business statistics.
- Understand the nature of the data
- Present and interpret data in tables and charts.
- Understand and apply descriptive statistical measures to business situations
- Understand and apply probability distributions to model different types of business processes.
- Understand and apply statistical estimation and hypothesis testing
- Understand and apply simple linear regression analysis
- Use computer spreadsheet software to perform statistical analysis on data.

3. Reading Material

Required Materials (Available in the Library or to Download)

- *Levine, D. M., Krehbiel, T. C., and Berenson, M. L. (2010) Business Statistics – A First Course, Fifth Edition, Pearson International Edition.*
- *De Veaux, R.D., Velleman, P. F., and Bock, D.E. (2009) Intro Stats, Third Edition. Pearson International Edition, Addison Wesley. Recommended Materials*

4. Teaching methodology

Lectures will combine theoretical sessions with practical exercises in the computer lab. Problem sets, data as well as slides will be available at the course web site during the semester.

5. Course Schedule

| Date | Class Agenda |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Session 1 06 / 09 | Topic: Introduction to Business Statistics Description: Introduction - Data Finding, collection, cleaning, coding Reading: Business Statistics, ch.1 Assignments/deadlines: None |
| Session 2 13 / 09 | Topic: Data organization, tables, graphs charts Description: Presenting Data in Tables and Charts Reading: Business Statistics, ch.1 Assignments/deadlines: Assignment 1 Calculating Market potential size |
| Session 3 20 / 09 | Topic: Numerical Descriptive Measures Description: Description of the data using basic statistical measures Reading: Business Statistics, ch.3 Assignments/deadlines: None |
| Session 4 27/09 | Topic: Numerical Descriptive Measures II Description: Introduction to concept of percentile, quartile, decile etc. Reading: Business Statistics, ch.3 Assignments/deadlines: None |
| Session 5 04 / 10 | Topic: Using Excel for data analysis Description: Basic tools, some advanced tools, self-study Reading: Business Statistics, ch.2 Assignments/deadlines: Assignment 2 - analysis of given data, differences between various measures, presentation and charts |
| Session 6 11 / 10 | Topic: Advanced work with tables and charts Description: Differences from expected value, dangers of charts, cheating with charts Reading: Business Statistics, ch.6 Assignments/deadlines: None |
| Session 7 18 / 10 | Topic: Time series, analysis, presentation Description: analysis, presentation of data in time Reading: Business Statistics, ch.9 Assignments/deadlines: Assignment 3 will be set. |
| 25 / 10 | Midterm break |
| Session 8 01 / 11 | Topic: Discussion of first part of the lecture, discussion on assignments Description: Reading: Assignments/deadlines: |
| Session 9 08 / 11 | Topic: Probability distributions Description: Random variable, random distribution, theoretical moments of random variables. Reading: Business Statistics, ch.6 Assignments/deadlines: |
| Session 10 15 / 11 | Topic: Sampling distributions, confidence interval estimation Description: Sampling and estimation, introduction to the concept of confidence interval Reading: Business Statistics, ch.7 & 8 Assignments/deadlines: Final project will be set |
| Session 11 22 / 11 | Topic: Factor analysis, basic idea, examples and interpretation Description: Advanced statistic methods Reading: Business Statistics, ch.10 Assignments/deadlines: None |
| Session 12 | Topic: Cluster analysis Description: Introduction, idea, basic methods, examples |

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|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 29 / 11 | Reading: Business Statistics, ch.13 Assignments/deadlines: None |
| Session 13 06 / 12 | Topic: Hypothesis testing Description: Introduction to the hypothesis testing Reading: Business Statistics, ch.9 Assignments/deadlines: None |
| Session 14 13 / 12 | Final exam |

6. Course Requirements and Assessment (with estimated workloads)

| Assignment | Workload (average) | Weight in Final Grade | Evaluated Course Specific Learning Outcomes | Evaluated Institutional Learning Outcomes* |
|----------------------|--------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Class Participation | 42 | 10 % | Good class participation means to react to stimuli from lecturer, ask questions related to the topic, come with own problems related to the topic, etc. | |
| Assignments 1 2 3 | 60 (20 each) | 45 % 15each) | Producing statistical analysis of data and interpretation of the results, tackling practical problems related to the data collection and data processing using theoretical knowledge acquired in class. | 1 |
| Midterm test | 10 | 15 % | Ability to describe and explain basic theoretical concepts. Application of these concepts to data analysis and solutions of various problems requiring statistical interpretation. | 1 3 |
| Final project / test | 38 | 30 % | Ability to collect, process and analyse data to give answers to proposed research questions; teamwork, presentation skills, adequate reaction to peer critique. | 2 3 |
| TOTAL | 150 | 100% | | |

*1 = Critical Thinking; 2 = Effective Communication; 3 = Effective and Responsible Action

7. Detailed description of the homework assignments

- Homework assignments: There will be 3 equally weighted sets of take-home problems.

Assignments have to be submitted individually - each student has to submit his/her own copy. Earlier submissions are allowed. No late submissions are accepted.

[Assignment 1]: Calculating Market potential size

| Assessed area | Percentage |
|----------------------------------------------------------------|------------|
| Ability to find data source and make basic operations in Excel | 15 |
| | |

[Assignment 2]: Analysis of given data, differences between various measures, presentation and charts

| Assessed area | Percentage |
|-------------------------------------------------------------------------------------------------------------|------------|
| Ability to analyse basic measures, find the differences and interpret them, present the findings in a chart | 15 |
| | |

[Assignment 3]: Work with data in 2Dtables, ability to interpret the findings and using proper charts

| Assessed area | Percentage |
|----------------------------------------------------------------------------------------|------------|
| Ability to collect and analyse the data, ability to present and interpret the findings | 15 |
| | |

[Midterm test]:

| Assessed area | Percentage |
|------------------------------------------------------------------------------------------------------------------------------|------------|
| Main topics from the first part of the semester. Basic calculation abilities, work with graphs, understanding of main topics | 15 |
| | |

[Final test]:

| Assessed area | Percentage |
|-----------------------------------------------------------------------------------------------------------------------------------|------------|
| Pt 1 Main topics from the second part of semester. Basic calculation abilities, work with graphs, understanding of main topics | 15 |
| Part 2 – individual task proving ability to collect data, calculate in Excel, present in graph interpret and explain the findings | |

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8. General Requirements and School Policies

General requirements

All coursework is governed by AAU’s academic rules. Students are expected to be familiar with the academic rules available in the Codex and Student Handbook and to maintain the highest standards of honesty and academic integrity in their work.

Electronic communication and submission

The university and instructors shall only use students’ university email address for communication, with additional communication via NEO LMS or Microsoft Teams. Students sending e-mail to an instructor shall clearly state the course code and the topic in the subject heading, for example, “COM101-1 Mid-term Exam. Question”. All electronic submissions are through NEO LMS. No substantial pieces of writing (especially take-home exams and essays) can be submitted outside of NEO LMS.

Attendance

Attendance, i.e., presence in class in real-time, is expected and encouraged. However, the requirement that students miss not more than 35% of real-time classes is temporarily suspended due to the COVID-19 pandemic.

Absence excuse and make-up options

Should a student be absent from classes for relevant reasons (illness, serious family matters), s/he can submit to the Dean of Students an Absence Excuse Request Form supplemented with documents providing reasons for the absence. These must be submitted within one week of the absence. If possible, it is recommended the instructor be informed of the absence in advance. Should a student be absent during the add/drop

period due to a change in registration this will be an excused absence if s/he submits an Absence Excuse Request Form along with the finalized add/drop form.

Students whose absence has been excused by the Dean of Students are entitled to make up assignments and exams provided their nature allows. Assignments missed due to unexcused absences which cannot be made up, may result in a decreased or failing grade as specified in the syllabus.

Students are responsible for contacting their instructor within one week of the date the absence was excused to arrange for make-up options.

Late work: No late submissions will be accepted – please follow the deadlines.

Electronic devices

Electronic devices (e.g. phones, tablets, laptops) may be used only for class-related activities (taking notes, looking up related information, etc.). Any other use will result in the student being marked absent and/or being expelled from the class. No electronic devices may be used during tests or exams unless required by the exam format and the instructor.

Eating is not allowed during classes.

Cheating and disruptive behavior

If a student engages in disruptive conduct unsuitable for a classroom environment, the instructor may require the student to withdraw from the room for the duration of the class and shall report the behavior to the Dean.

Students engaging in behavior which is suggestive of cheating will, at a minimum, be warned. In the case of continued misconduct, the exam or assignment will be failed and the student will be expelled from the exam or class.

Plagiarism and Academic Tutoring Center

Plagiarism is “the unauthorized use or close imitation of the language and thoughts of another author and the representation of them as one’s own original work.” (Random House Unabridged Dictionary, 2nd Edition, Random House, New York, 1993)

Turnitin’s White Paper ‘The Plagiarism Spectrum’ (available at <http://go.turnitin.com/paper/plagiarism-spectrum>) identifies 10 types of plagiarism ordered from most to least severe:

1. CLONE: An act of submitting another’s work, word-for-word, as one’s own.
2. CTRL-C: A written piece that contains significant portions of text from a single source without alterations.
3. FIND-REPLACE: The act of changing key words and phrases but retaining the essential content of the source in a paper.
4. REMIX: An act of paraphrasing from other sources and making the content fit together seamlessly.
5. RECYCLE: The act of borrowing generously from one’s own previous work without citation; To self-plagiarize.
6. HYBRID: The act of combining perfectly cited sources with copied passages—without citation—in one paper.
7. MASHUP: A paper that represents a mix of copied material from several different sources without proper citation.
8. 404 ERROR: A written piece that includes citations to non-existent or inaccurate information about sources
9. AGGREGATOR: The “Aggregator” includes proper citation, but the paper contains almost no original work.
10. RE-TWEET: This paper includes proper citation, but relies too closely on the text’s original wording and/or structure.

At minimum, plagiarism from types 1 through 8 will result in a failing grade for the assignment and shall be reported to the Dean. The Dean may initiate a disciplinary procedure pursuant to the Academic Codex. Allegations of bought papers and intentional

or consistent plagiarism always entail disciplinary hearing and may result in expulsion from AAU.

If unsure about technical aspects of writing, students are encouraged to consult with the tutors of the AAU Academic Tutoring Center. For more information and/or to book a tutor, please contact the ATC at: <http://atc.simplybook.me/sheduler/manage/event/1/>.

Course accessibility and inclusion

Students with disabilities are asked to contact the Dean of Students as soon as possible to discuss reasonable accommodations. Academic accommodations are not retroactive. Students who will be absent from course activities due to religious holidays may seek reasonable accommodations by contacting the Dean of Students in writing within the first two weeks of the term. All requests must include specific dates for which the student requests accommodations.

9. Grading Scale

| Letter Grade | Percentage* | Description |
|---------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | 95-100 | Excellent performance. The student has shown originality and displayed an exceptional grasp of the material and a deep analytical understanding of the subject. |
| A- | 90-94 | |
| B+ | 87-89 | Good performance. The student has mastered the material, understands the subject well and has shown some originality of thought and/or considerable effort. |
| B | 83-86 | |
| B- | 80-82 | |
| C+ | 77-79 | Fair performance. The student has acquired an acceptable understanding of the material and essential subject matter of the course, but has not succeeded in translating this understanding into consistently creative or original work. |
| C | 73-76 | |
| C- | 70-72 | |
| D+ | 65-69 | Poor. The student has shown some understanding of the material and subject matter covered during the course. The student's work, however, has not shown enough effort or understanding to allow for a passing grade in School Required Courses. It does qualify as a passing mark for the General College Courses and Electives. |
| D | 60-64 | |
| F | 0-59 | Fail. The student has not succeeded in mastering the subject matter covered in the course. |

* Decimals should be rounded to the nearest whole number.

Prepared by and when: Doc RNDr Ivan Tomek, 22 06 2021

Approved by and when:

Ing. Hana Prosdócimo Hajová, PhD, MBA, Chair of Mathematics and Computer Information Science Department

Date: 2nd July, 2021

Jan Vašenda, Ph.D., Dean, School of Business Administration, 26th August 2021.