

<b>Course name</b> Advanced Statistical Analysis for Social Sciences	<b>ECTS code</b> 02.06-S2-EN-ASA
<b>Provider</b> <i>University of Opole / Faculty of Social Sciences / Institute of Sociology</i>	
<b>Year of the study programme, semester, academic year:</b> 1. year, 2. semester, 2018/2019	
<b>Name of the instructor(s) &amp; email address:</b> Michał Wanke, <a href="mailto:michal.wanke@uni.opole.pl">michal.wanke@uni.opole.pl</a>  1. Michał Wanke (lecture) 2. Marcin Deutschmann (lab)	
<b>Forms of instruction / forms of classroom activity and ECTS credit points in relation to student's duties</b>	<b>ECTS credits: 6</b>  <ul style="list-style-type: none"> <li>• <i>participation in lectures: 15h</i></li> <li>• <i>participation in laboratories: 30h</i></li> <li>• <i>preparation to classes: 30h</i></li> <li>• <i>individual analysis: 60h</i></li> <li>• <i>office hours: 15h</i></li> </ul> Total 150h = 6 ECTS
<b>A. Forms of instruction and the number of hours:</b> <ul style="list-style-type: none"> <li>• <i>lecture (15 h)</i></li> <li>• <i>lab (30 h)</i></li> </ul>	
<b>B. Classroom activity:</b> <ul style="list-style-type: none"> <li>• <i>lecture and laboratory work in classroom</i></li> <li>• <i>individual analysis in laboratory</i></li> </ul>	
<b>Course status:</b> <ul style="list-style-type: none"> <li>• <i>obligatory</i></li> </ul>	<b>Language of instruction:</b> <ul style="list-style-type: none"> <li>• <i>English</i></li> </ul>
<b>Methods of instruction</b> <ul style="list-style-type: none"> <li>• <i>Interactive lecture introducing theoretical concepts and discussing students work</i></li> <li>• <i>Classes in the computer lab with statistical software</i></li> <li>• <i>Consulting ongoing students analysis in class and during office hours</i></li> </ul>	<b>Forms of crediting and basic criteria of evaluation or examination requirements.</b>
	<b>Form of credit:</b> <ul style="list-style-type: none"> <li>• <i>grade (labs)</i></li> <li>• <i>credit (lectures)</i></li> </ul>
	<b>B. Forms of evaluation:</b> <ol style="list-style-type: none"> <li><b>1. Lectures:</b> <ul style="list-style-type: none"> <li>• <i>Participation in the in class discussion</i></li> </ul> </li> <li><b>2. Labs:</b> <ul style="list-style-type: none"> <li>• <i>ongoing evaluation of the development of the student analysis in class</i></li> <li>• <i>evaluation of the report paper</i></li> </ul> </li> </ol>
	<b>C. Basic criteria:</b>  <i>The participation in lectures is credited and not graded. Student performance in labs is graded based on"</i> <ul style="list-style-type: none"> <li>• <i>the involvement and performance in the class assignments and analyses – 50%</i></li> <li>• <i>the final report – 50%</i></li> </ul>

**Entry requirements:** *as defined in the study programme*

**Course objectives:**

The aim of the course is to enable the students to use the statistical theory and quantitative analysis software (SPSS) together with online surveying software (LimeSurvey) to conduct their own statistical analysis for typical purposes of social science. The course is design in two parallel paths: the laboratory work with the data and software and the theoretical workshops for the statistical theory. Both descriptive and inferential statistics are used for a comprehensive understanding of the quantitative inquiry. The elements of data collecting and preparation are included so that the students are able to understand the whole process of data analysis, including the understanding of the role of the design of the measurement tools and data sources. The laboratory work will utilize both the students' own data collected during the course and the data collected in the lecturer's projects.

**Course content:**

*A. Lectures:*

- Introduction to the syllabus and to the topic of the course. Overview of the research project behind the course.
- The research process. Asking research questions. Collecting data. Introducing variables.
- Introducing LimeSurvey.
- Frequency distributions. Proportions, percentages, rates. Introducing visualizations of data.
- Measures of central tendency: mode, median, mean.
- Measures of variability: range, variance, standard deviation.
- Normal distribution. Standard normal distribution and standard normal table; the Z value. Sampling theory. Probability sampling. The concept of sampling distribution. The central limit theorem.
- Estimation: confidence intervals for means, confidence intervals for proportions.
- Testing hypothesis. Stating null hypothesis and the research hypothesis. Probability values and Alpha. Errors in hypothesis testing. Testing hypotheses: with one sample; two sample means.
- Cross tabulation. Properties of bivariate relationship. Chi-Square test and measures of association. Concept of statistical independence. Testing hypothesis with Chi-Square. Proportional reduction of error. Lambda, Cramer's V, Gamma and Kendall's Tau-b tests.
- Analysis of variance. Testing hypotheses with ANOVA. Regression and correlation. The scatter plot. Linear relationships and prediction. R square. Multiple regression. ANOVA for multiple linear regression.

*B. Labs:*

- General discussion: objectives of quantitative research; challenges and limitations.
- Defining variables in SPSS. Coding questionnaire data. Automatic import from LimeSurvey. Assignment: focus on a topic of choice of the research on the international students at the Uni of Opole. What can be measured? What would be interesting to learn? What facts? What opinions? What attitudes? Work in pairs.
- Creating a survey, creating groups, editing questions. Managing question types. Assignment: Prepare a research question - and survey items to measure it - for international students of the Uni of Opole. One

per a pair.

- Discussing the random sample of international students at the University of Opole is drew. Each student is assigned 4 research subjects to contact regarding taking the online survey. Assignment: the final version of the survey items per pair.
- Assignment: the report on the survey realization process from 4 respondents. The survey finishes. Data are imported to a database in SPSS.
- Outputting frequency distributions in SPSS. Calculating proportions, percentages, rates. Calculating measures of central tendency: mode, median, mean. Calculating measures of variability: range, variance, standard deviation.
- Hypothesis testing in SPSS. Assignment: Estimation of the proportions and means of the pair's variables from the international students' research.
- Cross-tabs in SPSS. Assignment: 4 hypothesis per pair tested from the international student's research.
- Testing hypotheses with ANOVA. Regression and correlation. The scatter plot. Linear relationships and prediction. R square. Multiple regression. ANOVA for multiple linear regression. Assignment: 4 bivariate relationships analyzed for the association and significance.
- Submitting a final report: your own analysis of international students at the Uni of Opole

**Reading list\***

**A. Obligatory reading (to get a credit):**

- Chava Frankfort-Nachmias, Anna Leon-Guerrero, *Social Statistics for a Diverse Society: chapter 1.* and Jack Levin, James Alan Fox,, David Forde, *Elementary Statistics in Social Research: chapter 1.*
- Chava Frankfort-Nachmias, Anna Leon-Guerrero, *Social Statistics for a Diverse Society: chapter 2* and Jack Levin, James Alan Fox,, David Forde, *Elementary Statistics in Social Research: chapter 2.*
- Chava Frankfort-Nachmias, Anna Leon-Guerrero, *Social Statistics for a Diverse Society: chapter 3* and Jack Levin, James Alan Fox,, David Forde, *Elementary Statistics in Social Research: chapter 3.*
- Chava Frankfort-Nachmias, Anna Leon-Guerrero, *Social Statistics for a Diverse Society: chapter 4* and Jack Levin, James Alan Fox,, David Forde, *Elementary Statistics in Social Research: chapter 4.*
- Chava Frankfort-Nachmias, Anna Leon-Guerrero, *Social Statistics for a Diverse Society: chapter 5, chapter 6* and Jack Levin, James Alan Fox,, David Forde, *Elementary Statistics in Social Research: chapter 5.*
- Chava Frankfort-Nachmias, Anna Leon-Guerrero, *Social Statistics for a Diverse Society: chapter 7* and Jack Levin, James Alan Fox,, David Forde, *Elementary Statistics in Social Research: chapter 6.*
- Chava Frankfort-Nachmias, Anna Leon-Guerrero, *Social Statistics for a Diverse Society: chapter 8* and Jack Levin, James Alan Fox,, David Forde, *Elementary Statistics in Social Research: chapter 7.*
- Chava Frankfort-Nachmias, Anna Leon-Guerrero, *Social Statistics for a Diverse Society: chapter 9 & chapter 10*

**B. Supplementary reading**

- Chava Frankfort-Nachmias, Anna Leon-Guerrero, *Social Statistics for a Diverse Society*
- Jack Levin, James Alan Fox,, David Forde, *Elementary Statistics in Social Research*

<b>Effects</b>	<b>Forms of evaluation</b>	<b>Reference to the programme effects</b>
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<p><b>Knowledge</b></p> <p>Student:</p> <ul style="list-style-type: none"> <li>• knows the methods of quantitative analysis in sociology</li> <li>• understands the logic of the quantitative research project</li> <li>• has an advanced knowledge of surveying and statistical data analysis software</li> <li>• knows descriptive statistics for social sciences</li> <li>• knows inferential statistics for social sciences</li> </ul>	<ul style="list-style-type: none"> <li>• <i>In class evaluation of assignments</i></li> <li>• <i>In class evaluation of analysis development</i></li> <li>• <i>Evaluation of the final report</i></li> </ul>	<p>K_W14 K_W15 K_W16 K_W17</p>
<p><b>Skills</b></p> <p>Student:</p> <ul style="list-style-type: none"> <li>• can state the research problem and hypotheses</li> <li>• can select the appropriate methodology for the research problem</li> <li>• can interpret the data and discuss the research results</li> <li>• is able to write a research report</li> <li>• is able to interpret the empirical relationships between variables</li> <li>• is able to establish causation</li> <li>• can use statistical theory for the sociological inquiry</li> </ul>	<ul style="list-style-type: none"> <li>• <i>In class evaluation of assignments</i></li> <li>• <i>In class evaluation of analysis development</i></li> <li>• <i>Evaluation of the final report</i></li> </ul>	<p>K_U01 K_U06 K_U09 K_U11 K_U12</p>
<p><b>Social competences</b></p> <p>Student:</p> <ul style="list-style-type: none"> <li>• is open to use different research strategies and theoretical approaches and is aware of the place of statistical reasoning in the sociological enterprise</li> <li>• is ready and eager to research her own quantitative analytical project</li> <li>• is able to formulate her own research problems and hypotheses and is confident in using statistical reasoning to answer them</li> <li>• is reflexive in use of ICT in sociological research</li> </ul>	<ul style="list-style-type: none"> <li>• <i>In class evaluation of assignments</i></li> <li>• <i>In class evaluation of analysis development</i></li> <li>• <i>Evaluation of the final report</i></li> </ul>	<p>K_K05 K_K09 K_K10 K_K21</p>