COURSE GUIDE

Subject name	Statistics in production
Course of study	**Quality and Production Management**
The form of study	**Full-time**
Level of qualification	**First**
Year	**I**
Semester	**II**
The implementing entity	**Department of Statistics and Econometrics**
The person responsible for preparing	**dr Sylwia Nieszporska**
Profile	**General academic**
ECTS points	**3**

TYPE OF TEACHING – NUMBER OF HOURS PER SEMESTER

LECTURE	CLASS	LABORATORY	PROJECT	SEMINAR
15	**15**	**-**	**-**	**-**

COURSE AIMS

C1. To acquaint students with the theoretical foundations of statistical measures that are used to describe the structure of the population, to analyses the interdependence of socio-economic phenomena, and to educate students on using these measures.

C2. To acquaint students with the basic methods of statistical inference.

C3. To train students on planning and realizing a comprehensive analysis of a phenomena in production process using known statistical methods and rules of statistical inference.

ENTRY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. A student should know the basics of mathematical analysis.
2. A student should identify and understand the basic terms in the field of socio-economic sciences.
3. A Student should plan the computational procedures and use his new skills to work with different computational packages.
4. A student should be able to organize his own work with the principles of logical inference.

LEARNING OUTCOMES

EU1. A student is able to use statistical measures to describe the structure of the phenomenon, to analyze the interdependence of the phenomenon especially in the production process.

EU2. A student is able to estimate the basic parameters of the distribution of the general population and statistically verify the selected hypotheses concerning the basic parameters of the distribution of the general population.

EU3. A student can interpret statistical measures she/he knows.

EU4. A student demonstrates competence in combining active and creative knowledge in statistics and economics, in particular is able to use known statistical tools to perform the analysis of the production process in the company and to assist in the decision making process.

COURSE CONTENT

Type of teaching – LECTURE	Number of hours
W1. The goal and subject of statistics and presentation statistical research.	1
W2. Basis methods of description of the structure of a population - measures of a central tendency, variability, asymmetry and concentration. Gretl and Excel and use both programs to solve problematic problems.	3
W3. Statistical methods for studying the interdependence of socio-economic phenomena: Pearson's linear correlation coefficient, Spearman's rank correlation coefficient, regression analysis. Gretl and Excel and use both programs to solve problematic problems.	3

W4. Dependence analysis of unmeasurable characteristic - chi-squared statistics.	1
W5. The basis of theory of a probability. A discrete and continuous variables.	3
W6. Elements of estimation - interval estimation of a mean, a variance and a fraction of the population. Minimum sample size	2
W7. Statistical tests. Parametric tests for a mean and a variance.	2
Type of teaching – CLASS	**Number of hours**
C1. Measures of a central tendency, variability and skewness.	3
C2. Analysis of a structure of the population with using specialized software packages.	1
C3. Methods of recognition of types of relationships between variables - correlation graphs. Pearson's linear correlation coefficient and its use to evaluate the strength and direction of the linear correlation relationship. Analysis of the interdependence with using regression function. Dependence analysis of unmeasurable characteristic - Spearman's coefficient of rank correlation and chi-sguared statistics.	3
C4. The test.	1
C5. A theory of a probability - The discrete and continuous random variable and its distribution, an expectation value and variance. A normal, t-Student and chi-squared distributions.	2
C6. Confidence intervals for a mean and a standard deviation in a population.	2
C7. Hypothesis tests for a mean and a standard deviation for random variables in the population.	2
C8. The test.	1

TEACHING TOOLS
1. Blackboard, chalk.
2. Computers and multimedia projector.
3. Software: Statistica, Excel.
4. Books, Statistical Yearbooks, database.

WAYS OF ASSESSMENT (F – FORMATIVE, P – SUMMATIVE)
F1. The current assessment of student activity.
F2. Tests verifying the effects of teaching at different levels of education and skills using known computer packages.
P1. A comprehensive assessment of students' work throughout the semester, taking into account all the partial marks.

STUDENT WORKLOAD

Form of activity		Average number of hours for realization of the activity		
		[h]	ECTS	ECTS
Contact hours with the teacher	Lecture	15	0.66	1.19
Preparing to test		12	0.53	
Contact hours with the teacher	Class	15	0.66	0.93
Preparing to classes		8	0.27	
Getting acquainted with the indicated literature		10	0.28	0.28
Consultation		15	0.6	0.6
TOTAL NUMBER OF HOURS / ECTS CREDITS FOR THE COURSE		**75**	**3**	

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS
Basic resources
1. Ness Evans A. Using Basic Statistics in the Behavioral and Social Sciences. SAGE Publications Ltd, 2013.

2. Bluman A. Elementary Statistics: A Step By Step Approach. Mcgraw-Hill Publ.Comp., 2011.
3.

Supplementary resources

1. Crawshaw J., Chambers J. A concise course in advanced level statistics. Nelson Thornes Ltd., 2002.
2. Ostasiewicz S., Rusnak Z., Siedlecka U. Statystyka. Elementy teorii i zadania. Uniwersytet Ekonomiczny we Wrocławiu, Wrocław 2011.
3. Suchecka J. Metody statystyczne: zarys teorii i zadania. Wydział Zarządzania Politechniki Częstochowskiej, Wydanie II, Częstochowa 2003.

TEACHERS (NAME, SURNAME, E-MAIL ADDRESS)
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MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	Reference of given outcome to outcomes defined for whole program (PRK)	Course aims	Course content	Teaching tools	Ways of assessment
EU1	K_W01, K_W02, K_W04, K_W08, K_U01, K_U02, K_U04, K_U05, K_U07, K_K04	C1,C3	W1-W4, C1-C4	1,2,3,4	F1,F2,P1
EU2	K_W01, K_W02, K_W04, K_W08, K_U01, K_U02, K_U04, K_U05, K_U07, K_K04	C2,C3	W5-W7, C5-C8	1,2,3,4	F1,F2,P1
EU3	K_W01, K_W02, K_W04, K_W08, K_U01, K_U02, K_U04, K_U05, K_U07, K_K01, K_K04, K_K05	C1, C2, C3	W2-W7, C1-C8	1,2,3,4	F1,F2,P1
EU4	K_W01, K_W02, K_W04, K_W08, K_U01, K_U02, K_U04, K_U05, K_U07, K_K01, K_K04, K_K05	C1, C2, C3	W2-W7, C1-C8	1,2,3,4	F1,F2,P1

FORM OF ASSESSMENT - DETAILS

	grade 2	grade 3	grade 4	grade 5
EU1	A student is unable to calculate the measures that describe the structure of the population, the correlation measure of socio-economic phenomena and a phenomena in the production process.	A student correctly calculates some of the measures that describe the structure of the population, the correlation measure of socio-economic phenomena and a phenomena in the production process.	A student correctly calculates all measures she/he knows that describe the structure of the population, the correlation of socio-economic phenomena and a phenomena in the production process.	A student correctly calculates all measures she/he knows that describe the structure of the population, the correlation of socio-economic phenomena and a phenomena in the production process. Independently identifies statistical tools and select the most proper ones.
EU2	A student is not able to estimate any parameter of the general population. He/she can't verify statistical hypotheses.	A student correctly reckons the confidence intervals for the selected parameter of the general population. He/she can use some parametric tests.	A student correctly estimates parameters of the distribution of the general population. The student can verify the selected hypotheses concerning the basic parameters of the distribution of the general population.	A student correctly estimates parameters of the distribution of the general population. The student can verify the hypotheses concerning the basic parameters of the distribution of the general population. Creatively implements methods of statistical inference in the analysis

				of the production process. He/she effects a substantive discussion of possible solutions.
EU3	Student doesn't know the interpretation of the individual measures.	Student knows the interpretation of some measures he/she knows.	Student knows the interpretation of all measures he/she knows.	Student knows the interpretation of all measures he/she knows. He/she interprets all measures relatively to socio-economic phenomena and a phenomena in the production process.
EU4	A student can't find a relationship between statistical measures and a phenomena in the production process.	Student notes some of the relationships between statistical measures and a phenomena in the production process.	Student skillfully connects the statistical knowledge to the analysis of real economic phenomena. He/she can use the known statistical tools to analyses the selected issues of the production process.	Student skilfully connects the statistical knowledge to the analysis of real economic phenomena. He/she can use the known statistical tools to analyse the selected issues of the production process. Independently and critically selects the statistical measures and indicates the possibility of their application in the analysis of various issues relating to the decisionmaking process.

ADDITIONAL USEFUL INFORMATION ABOUT THE COURSE

1. Information where presentation of classes, instruction, subjects of seminars can be found, etc. - presented to students during first classes, if required by the formula classes are sent electronically to the e-mail addresses of individual dean groups.
2. Information about the place of classes - Information can be found on the website of the Faculty of Management.
3. Information about the timing of classes (day of the week / time) - Information can be found on the website of the Faculty of Management.
4. Information about the consultation (time + place) - Information can be found on the website of the Faculty of Management.