COURSE GUIDE

Course unit tilte	**Statistics**
Field of study	**Management and Engineering of a Production**
Form of study	**intramural**
Level of study	**1st level**
Year	**II**
Semester	**IV**
Responsible unit	**Department of Statistics and Econometrics**
Responsible person	**ph.d. Sylwia Nieszporska**
Profile	
Type of course	**basic**
Number of ECTS credits	**3**

TEACHNING METHODS – NUMBER OF HOURS PER SEMESTER

LACTURE	CLASSES	LABORATORY	PROJECT	SEMINAR
15	**15**			

COURSE PURPOSES

C1. To acquaint students with the theoretical foundations of statistical measures that are used to describe the structure of the population, the analysis of the dynamics of the phenomena and to analyse the interdependence of socio-economic phenomena, and to educate students on using these measures.
C2. To educate students for the ability of self-interpretation and verification of the results of empirical calculations connected with the analysis of the structure of the general population, the analysis of dynamic and analysis of the interdependence of the socio-economic phenomena.
C3. To acquaint students with the elements of probability and the basic methods of statistical inference.
C4. To train students on planning and realizing a comprehensive independent analysis of socio-economic phenomena using known statistical methods and rules of statistical inference.

INITIAL REQUIREMENTS FOR THE KNOWLEDGE, ABILITIES 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 their new skills to work with different computational packages.
4. A student should be able to organize their own work with the principles of logical inference.

THE EFFECTS OF EDUCATION

EK 1 – A student independently develops a statistical research.
EK 2 – A student is able to estimate the structure of the phenomenon using statistical measures and specialized software packages.
EK 3 - A student uses statistical methods to analyze the interdependence of socio-economic phenomenon.
EK 4 – A student can evaluate and interpret statistical measures of dynamic phenomena.
EK5- 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.
EK 6 - 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

Teaching method – LECTURE	**Number of hours**
W1 The goal of statistics, basics definitions	1
W2 The structure of a population - measures of a central tendency, variability and skewness - using known statistical tools to perform the analysis of the production process.	2
W3 Theory of a probability - discrete and continuous random variable, parameters of the distributions	2
W4 Estimation – sampling, distribution of the sample mean and the sample variance. Central limit theorem. Confidence intervals.	2
W5 Hypothesis testing – critical values, and tests for a mean and a variance	2
W6 Correlation and regression in production process and decision-making process – a regression function, Pearson's product-moment coefficient of correlation, Spearman's coefficient of rank correlation.	2
W7 Correlation between unmeasurable variables – chi-squared statistics.	1
W8 Decomposition of the time series – the linear trend and the seasonal fluctuations.	2
W9 Indexes in socio-economics phenomena.	2
	Sum 15
Teaching method – CLASSES	**Number of hours**
C1 Measures of a central tendency, variability and skewness	2
C2 Analysis of a structure of the population with using specialized software packages.	1
C3 Confidence intervals for a mean and a standard deviation.	2
C4 Hypothesis tests for a mean and a standard deviation	2
C5 The test	1
C6 A regression function, Pearson's product-moment coefficient of correlation, Spearman's coefficient of rank correlation.	2
C7 Correlation between socio-economics variables with using specialized software packages	1
C8 The linear trend and the seasonal and accidental fluctuations.	2

C9 The absolute and relative changes, indexes.	1
C10 The test	1
	Sum 15

TEACHNING TOOLS

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

WAYS OF ASSESSMENT (F – FORMING, P – SUMMARY)

F1. The current assessment of student activity
F2. Rating creativity in the work team
F3. 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 to complete the activity**		
		[h]	ECTS	ECTS
Contact hours with the teacher	LECTURE	**15**	**0,6**	**0,6**
Preparing to exam				
Exam				
Contact hours with the teacher	CLASSES	**15**	**0,6**	**1,8**
Preparing to classes		**20**	**0,8**	
Preparing to test		**10**	**0,4**	
Getting Acquainted with the indicated literature		10	0,4	0,4
Consultation		**5**	**0,2**	**0,2**
TOTAL NUMBER OF HOURS / ECTS CREDITS FOR THE COURSE		**∑75**	**∑ 3**	

BASIC AND SUPPLEMENTARY LITERATURE

Basic literature:

1. Annabel Ness Evans, *Using Basic Statistics in the Behavioral and Social Sciences*, SAGE Publications Ltd, 2013.

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

3. J. Crawshaw, J. Chambers, *A concise course in advanced level statistics*, Nelson Thornes Ltd., 2002.

Supplementary literature:

1. Kończak G., Trzpiot G., *Metody statystyczne z wykorzystaniem programów komputerowych*,

Wydawnictwo Akademii Ekonomicznej im. Karola Adamieckiego w Katowicach, Katowice 2004.

2. Luszniewicz A., Słaby T., *Statystyka z pakietem komputerowym STATISTICA.PL. Teoria i praktyka*. Wydawnictwo C.H. Beck, Warszawa, 2008.
3. Piłatowska M., *Repetytorium ze statystyki*, PWE, Warszawa 2006.
4. Suchecka J., *Metody statystyczne: zarys teorii i zadania*, Wydział Zarządzania Politechniki Częstochowskiej, Wydanie II, Częstochowa 2003.
5. Ostasiewicz S., Rusnak Z., Siedlecka U., *Statystyka. Elementy teorii i zadania*, Wydawnictwo AE im. Oskara Langego we Wrocławiu, Wrocław 1998.

TEACHERS (NAME, SURNAME, ADRES E-MAIL)

1. Ph.d. Nieszporska Sylwia, sylniesz@poczta.onet.pl

MATRIX OD REALIZATION OF EFFECTS OF EDUCATION

The effects of education	The reference of the effect to the effects defined for the entire program (PEK)	Course purposes	Course content	Teachning tools	Ways of assessment
EK1	K_W01, K_W23, K_U01, K_U21, K_K01	C4	W1	1,2,3,4	F1,F2
EK2	K_W23, K_W26, K_U01, K_U11, K_U21, K_U23, K_U24, K_K04	C1,C2,C4	W2,C1, C2	1,2,3,4	F1,F2, F3, P1
EK3	K_W06, K_W26, K_U03, K_U11, K_U21, K_U23, K_U24, K_K03	C1,C2,C4	W6, W7, C6, C7	1,2,3,4	F1,F2, F3, P1
EK4	K_W01, K_W23, K_W26, K_U11, K_U21, K_U23, K_U24, K_K01	C1,C2,C4	W8, W9, C8, C9	1,2,3,4	F1,F2, F3, P1
EK5	K_W01, K_W06, K_W26, K_W27, K_U11, K_U18, K_U21, K_U23, K_U24, K_K04	C3,C4	W3, W4, W5, C3, C4	1,2,3,4	F1,F3, P1
EK6	K_W10, K_W13, K_W23, K_W26, K_W27, K_U03, K_U05, K_U11, K_U21, K_U23, K_U24, K_K01, K_K09	C1,C2,C3,C4	W2,W6,W8,W9, C2, C7,C8	1,2,3,4	F1,F2,P1

ASSESSMENT FORM - DETAILS

	For grade 2	For grade 3	For grade 4	For grade 5
EK1	A student can not find the easiest way to prepare the statistical research.	A student presents only a theoretical idea in the construction of the statistical research.	A student is able to propose the statistical study in detail on a selected topic.	A student is able to propose the statistical research in detail on any topic, and to foresee possible difficulties related to the

				implementation of the project.
EK2	A student is unable to calculate the measures that describe the structure of the population or does not know the interpretation of the individual measures.	A student correctly calculates the measures that describe the structure of the population and can provide interpretation of certain measures.	A student correctly calculates the measures that describe the structure of the population and properly interprets all of them.	A student correctly calculate the measure that describe the structure of the population and properly interprets all of them. Independently identifies statistical tools and select the most proper ones.
EK3	A student is unable to calculate the correlation measure of socio-economic phenomena.	A student is able to calculate the measure of correlation of socio-economic phenomena and can interpret certain measures.	A student is able to calculate the measure of correlation of socio-economic phenomena and interpret them correctly.	A student is able to calculate the measure of correlation of socio-economic phenomena and interpret them correctly. He/she can compare the efficiency of used statistical tools.
EK4	A student is unable to calculate the measures of the dynamics of socio-economic phenomena.	A student is unable to calculate the measures of the dynamics of socio-economic phenomena and can interpret certain measures.	A student correctly calculates the measures of the dynamics of the phenomena and interprets all of them properly.	A student correctly calculates the measures of the dynamics of the phenomena and interprets all of them properly. Creatively implements statistical tools in the assessment of the dynamics of economic phenomena.
EK5	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 and can interpret confidence intervals. 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 and can interpret confidence intervals. The student can verify the selected 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. Effects a substantive discussion of possible solutions.
EK6	A student can't find a relationship between statistical measures and socio-economic phenomena.	Student notes some of the relationships between statistical measures and socio-economic phenomena.	Student skillfully 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.	Student skillfully 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 decision-making process.

OTHER USEFUL INFORMATION ABOUT THE COURSE

1. Information about where you can see the presentations to classes, lab instructions, etc. are sent electronically to the e-mail addresses of individual groups.
2 Information on the place of the schedule - information can be found on the website of the department.
3 Information on the timing of classes (day of week / time) - information can be found on the website of the department.
4 Information on the consultation (hours + space) - are given to students during the first class, can be found on the website of the department and information showcase of the Department of Statistics and Econometrics.

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Signature of the responsible person