



Applied statistics Syllabus

Basic information

Field of study* Doctoral school	Didactic cycle 2019/2020
Specialisation -	Subject code UEPSDS.610.13109.19
Organizational unit UEP	Language of instruction Polish
Level of qualification Third-cycle programme	Mandatory Obligatory
Mode of study Full-time	Block Blok 0
Track General academic	
Person responsible for the content of the syllabus	Maciej Beręsewicz

Period Semester 1	Method of evaluation Exam	Number of ECTS points 3
	Activities and hours • Participation in lectures: 15 • Participation in classes: 30	

Subject's educational aims

C1	Zapoznanie z problematyką statystyki stosowanej w naukach ekonomicznych w zakresie przygotowania, realizacji i odtwarzalności z wykorzystaniem narzędzi open source
C2	Zapoznanie z ograniczeniami klasycznych metod statystycznych w naukach ekonomicznych
C3	Nabywanie umiejętności oceny i doboru odpowiednich metod statystycznych w narzędziach open source

Entry requirements

Podstawowa wiedza i umiejętności z zakresu statystyki, ekonometrii i informatyki

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge			
W1	Zna różnicę między big data a źródłami danych statystycznych	K3_W01, K3_W02, K3_W03, K3_W05	Written exam, Written exam with open questions, Final quiz, Final test, Class participation
W2	Zna pojęcie reprezentatywności i potrafi ją ocenić	K3_W01, K3_W03	Written exam, Written exam with open questions, Final quiz, Final test, Class participation
W3	Zna metody statystyczne wykorzystywane w praktyce badań ekonomicznych w narzędziach open source	K3_W02, K3_W03	Written exam, Written exam with open questions, Final quiz, Final test, Class participation
W4	Zna ograniczenia wynikające z interpretacji p-value	K3_W01	Written exam, Written exam with open questions, Final quiz, Final test, Class participation
Skills			
U1	Potrafi wybrać źródła danych i dobrać odpowiednie metody statystyczne / ekonometryczne / uczenia maszynowego	K3_U01, K3_U04	Written exam, Written exam with open questions, Final quiz, Final test, Class participation
U2	Potrafi zaplanować badanie statystyczne z wykorzystaniem poznanych źródeł danych i metod analizy danych	K3_U01, K3_U03, K3_U04, K3_U05	Written exam, Written exam with open questions, Final quiz, Final test, Class participation
U3	Potrafi przygotować powtarzalne i odtwarzalne badania ekonomiczne	K3_U03, K3_U04	Written exam, Written exam with open questions, Final quiz, Final test, Class participation
U4	Potrafi wykorzystać otwarte narzędzie statystyczne do przeprowadzenia badań	K3_U01	Written exam, Written exam with open questions, Final quiz, Final test, Class participation
Social competences			
K1	Jest świadomy ograniczeń wynikających z wykorzystania big data w badaniach ekonomicznych	K3_K01, K3_K03	Written exam, Written exam with open questions, Final quiz, Final test, Class participation

K2	Jest świadomy istotności powtarzalnych obliczeń w ekonomii	K3_K01, K3_K02	Written exam, Written exam with open questions, Final quiz, Final test, Class participation
K3	Jest świadomy ograniczeń wynikających z interpretacji p-value w badaniach ekonomicznych	K3_K02	Written exam, Written exam with open questions, Final quiz, Final test, Class participation

Study content

No.	Course content	Subject's educational goals	Subject's learning outcomes
1.	Big data a źródła statystyczne	C1, C3	W1, W2, U1, K1
2.	Reprezentatywność i jej znaczenie w badaniach	C1, C3	W1, W2, U1, K1
3.	Projektowanie badań statystycznych	C2, C3	W3, U1, U2, K1
4.	Znaczenie eksploracyjnej analizy danych	C2, C3	W3, U1, U2
5.	Statystyka a uczenie maszynowe	C2, C3	W1, U3, U4, K1
6.	Dobór metod statystycznych	C2, C3	W3, U1, K1, K2
7.	Znaczenie pakietów statystycznych i narzędzi open source w analizach statystycznych	C2, C3	W3, U1, U3, U4, K2
8.	Problemy z istotnością statystyczną (p-values)	C2, C3	W3, W4, U2, U3, K2, K3
9.	Odtwarzalność i powtarzalność badań statystycznych w ekonomii	C1, C3	W3, W4, U2, U3, K2, K3
10.	Statystyka częstościowa a bayesowska	C2, C3	W3, K1, K3

Bibliography

Obligatory

1. Beresewicz, M., Lehtonen, R. T., Reis, F., Di Consiglio, L., & Karlberg, M. (2018). An overview of methods for treating selectivity in big data sources, Eurostat
2. Japac, L., Kreuter, F., Berg, M., Biemer, P., Decker, P., Lampe, C., ... Usher, A. (2015). Big data in survey research: Aapor task force report. Public Opinion Quarterly, 79(4), 839-880. <https://doi.org/10.1093/poq/nfv039>
3. The American Statistician (2019), Statistical Inference in the 21st Century: A World Beyond $p < 0.05$, 73 (1)
4. Wasserstein, R. L., & Lazar, N. A. (2016). The ASA's statement on p-values: context, process, and purpose. The American Statistician, 70(2), 129-133.

Recommended

1. Einav, L., & Levin, J. (2014). Economics in the age of big data. Science, 346(6210), 1243089.
2. The American Statistician (2018), Special Issue on Data Science, 72 (1)
3. Varian, H. R. (2014). Big data: New tricks for econometrics. Journal of Economic Perspectives, 28(2), 3-28.

Course advanced

Teaching methods:

Discussion, Case study, Laboratories

Teaching methods	Method of evaluation	Credit conditions
Lectures	Written exam, Written exam with open questions	Uzyskanie co najmniej 60% punktów
Classes	Final quiz, Final test, Class participation	Uzyskanie co najmniej 60% punktów

Calculation of ECTS points

Activity form	Activity hours*	
Participation in lectures	15	
Participation in classes	30	
Preparation for exam	15	
Preparation for test	30	
Student workload	Hours 90	ECTS 3.0
Workload involving teacher	Hours 45	ECTS 1.5
Practical workload	Hours 30	ECTS 1.0

* one hour of classes = 45 minutes

Effects

Code	Content
K3_K01	is prepared for a critical analysis of scientific achievements within a given scientific discipline, including her/his contribution to its development
K3_K02	is prepared to fulfil the social duties of a researcher, to think and act in an entrepreneurial way
K3_K03	is prepared to maintain and improve an ethos of research milieu, in particular to do research independently and to respect a rule of public ownership of research results, taking into consideration the rules of the intellectual property protection
K3_U01	can apply knowledge to the creative identification, formulation and innovative solving of research problems, in particular: is able to define a research aim and subject , formulate a hypothesis, develop research methods and tools and to apply them in the creative manner, and to interpret and make conclusions based on the research results
K3_U03	can communicate on specialist topics at the level that enables to actively participate in the international environment and to disseminate the research results
K3_U04	can independently gain and extend knowledge and skills, plan the scientific career, inspire and organize development of other people
K3_U05	can design classes or groups of classes with a use of modern methods and tools
K3_W01	knows and comprehends the global achievements in terms of theories, general ideas and selected detailed issues from the discipline connected with the research area that enables to revise existing
K3_W02	knows and comprehends research methodology to the extent that enables to formulate and solve research problems using research methods and tools appropriate to any given discipline
K3_W03	knows and comprehends the main tendencies in disciplines in which education is being provided
K3_W05	knows and comprehends the fundamental dilemmas of the modern civilization