



POZNAŃ UNIVERSITY  
OF ECONOMICS  
AND BUSINESS

# Syllabus

## Field of study\* : Transition, Innovation and Sustainability Environments

Subject name Applied quantitative methods for economic analysis		
Subject name in English Applied quantitative methods for economic analysis		
Subject code UEPTISES.24B.13284.22	Year / semester 2 / 3	Method of evaluation Assessment
Specialisation All	Track General academic	Level of qualification Second-cycle programme
Mode of study Full-time	Language of instruction English	Subject Obligatory
Number of hours Lectures: 30      Classes: 0	Number of ECTS points 4	Block B
Responsible	Barbara Będowska-Sójka	

### Subject's educational aims

C1	To enable students to carry out quantitative analysis of empirical economic data.
C2	To give students modern programming tools in empirical analysis.
C3	To enable students to generate forecasts of real economic processes in modern economies.
C4	To foster the ability of students to assess real impact of economic processes and the relevance of dependencies between different variables thorough the application of machine learning.

### UEP goals

Code	Goal content
CS2_1.1	students will critically reflect on practical and theoretical issues
CS2_1.2	students will critically evaluate alternatives in order to arrive at an optimal solution
CS2_1.3	students will have an understanding of the most important aspects of macro- and micro-environmental influence on business decisions
CS2_2.1	students will use their team-building skill to complete group tasks
CS2_2.2	students will demonstrate leaderships skills and will work effectively in a team.
CS2_2.3	students will produce written assignments/oral presentations following academic standards
CS2_3.2	students will understand corporate social responsibility and sustainable development
CS2_3.3	students will understand and appreciate other cultures, as well as international and social diversity

### Subject's learning outcomes

Code	Outcomes in terms of	Learning outcomes within the field of study
Knowledge		
W1	Student understands and explains the principles and processes of sustainable development and resilience in social systems with special consideration of science, technology and society issues and thereby realizing the vulnerabilities	K2_W02, K2_W03, K2_W05
W2	Student identifies assumptions underlying scientific methodologies and connected human-environment issues	K2_W02, K2_W03, K2_W05
W3	Student illustrates the nature of human technology interactions and human computer interactions and their implications on the individual as well as on the diverse arena of interrelations and social innovation	K2_W02, K2_W03, K2_W05
Skills		
U1	Student generates an interdisciplinary understanding of human technology interactions, technology as a driver of change, and describe its impact on society on diverse levels.	K2_U01, K2_U02, K2_U05, K2_U06
U2	Student initiates and applies collective problem solving and innovation strategies as well as crisis resolution strategies	K2_U01, K2_U02, K2_U05, K2_U06
U3	Student applies research and research management skills, designs research projects in groups and individually, uses research methods (quantitative, qualitative, mixed methods, system analysis, as well as methods of transdisciplinary)	K2_U01, K2_U02, K2_U05, K2_U06
U4	Student integrates knowledge, handles uncertainty and complexity, designs and implements innovation spaces, formulates judgements and communicates them to a wider audience.	K2_U01, K2_U02, K2_U05, K2_U06
Social competences		
K1	Student is open towards multiple perspectives of science areas and stakeholders' groups, critical, committed to knowledge-based initiatives, reflective, when implementing changes, and assessing results.	K2_K01, K2_K03, K2_K04, K2_K05, K2_K06
K2	Students appreciate innovators and cares for integrative, co-creative, transdisciplinary processes.	K2_K01, K2_K03, K2_K04, K2_K05, K2_K06
K3	Students are self-confident, oriented towards professional perspectives and opportunities for action	K2_K01, K2_K03, K2_K04, K2_K05, K2_K06
K4	Students appreciate an evidence based independent decision-making process and care for promotion of inventions and innovations.	K2_K01, K2_K03, K2_K04, K2_K05, K2_K06
K5	Graduates are reliable and effective team members and leaders of a group, responsible supporters of professional development	K2_K01, K2_K03, K2_K04, K2_K05, K2_K06

### Study content

No.	Study content	Subject's educational aims	Subject's learning outcomes
1.	Simple and multiple regression analysis	C1, C2, C3, C4	W1, W3, U1, K4
2.	Logit regression	C1	W2, U2, U4, K3, K5
3.	Time-series analysis	C3	U3, K1
4.	Panel data	C1	U2, K2

5.	Neural networks	C2	W3, U3
6.	Machine learning algorithms (random forests)	C4	W2, U2, K5

## Bibliography

### Obligatory

1. Wooldridge J.M., Introductory Econometrics. A modern approach, Cengage Learning 2016.
2. Gábor Békés, Gábor Kézdi, Data Analysis for Business, Economics, and Policy, Cambridge University Press 2021.
3. Greene W.H., Econometric Analysis, Pearson, 2018.

### Recommended

1. Ciaburro G., Venkateswaran B., Neural networks with R, Packt Publishing, 2017.
2. David Ruppert, David S. Matteson, Statistics and Data Analysis for Financial Engineering with R examples, Springer Texts in Statistics, 2015.
3. Chiu Yu-Wei, Machine Learning with R Cookbook, Packt Publishing, 2015.

Entry requirements	<ul style="list-style-type: none"> <li>• Basic mathematics,</li> <li>• Statistics</li> </ul>
Teaching methods	Project method, Lecture with multimedia presentation, Discussion, Case study, Exercises, Laboratories
Method of evaluation	Final quiz, Individual project, Presentation, Moodle quiz

## Settlement of ECTS points

Forms of student work	Average number of hours for student work*	
Participation in lectures	30	
Project preparation	40	
Empirical research	10	
Consultations with teacher	20	
<b>Student work in total</b>		
	Number of hours 100	ECTS points 4
<b>Contact hours (with the teacher)</b>		
	Number of hours 50	ECTS points 2
<b>Practical-class work</b>		
	Number of hours 50	ECTS points 2

\* one hour of classes = 45 minutes

## Methods of evaluating the learning outcomes

Learning-outcome code	Methods of evaluation			
	Final quiz	Individual project	Presentation	Moodle quiz
W1		x		
W2		x		

W3	x		x	x
U1	x			
U2		x		x
U3		x	x	
U4			x	x
K1		x	x	
K2			x	x
K3	x			
K4				x
K5		x	x	

## Effects

Code	Content
K2_K01	graduates are professionals, open to multiple perspectives of science areas and stakeholders' groups, critical, committed to knowledge-based initiatives, reflective, when implementing changes, and assessing results
K2_K03	graduates are motivated innovators and promoters of integrative, co-creative, transdisciplinary processes
K2_K04	graduates are self-confident, realistically recognize professional perspectives and opportunities for action
K2_K05	graduates are capable of evidence based independent decision-making and responsible promoters of inventions and innovations
K2_K06	graduates are reliable and effective team members and leaders of a group, responsible supporters of professional development
K2_U01	graduates possess developed ability to generate an interdisciplinary understanding of human technology interactions, technology as a driver of change, and describe its impact on society on diverse levels
K2_U02	graduates possess developed ability to initiate and apply collective problem solving and innovation strategies as well as crisis resolution strategies
K2_U05	graduates possess developed ability to use research and research management skills, design research projects in groups and individually, use research methods (quantitative, qualitative, mixed methods, system analysis, as well as methods of transdisciplinary)
K2_U06	graduates possess developed ability to integrate knowledge, handle uncertainty and complexity, design and implement innovation spaces, formulate judgements and communicate them to a wider audience
K2_W02	graduates have deep understanding of the principles and processes of sustainable development and resilience in social systems with special consideration of science, technology and society issues and thereby realizing the vulnerabilities (chances and risks) induced
K2_W03	graduates have deep understanding of the identification and specification underlying scientific methodologies and connected human-environment issues
K2_W05	graduates have deep understanding of the nature of human technology interactions and human computer interactions and their implications on the individual as well as on the diverse arena of interrelations and social innovation