<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">Time series and panel data analysis</td></tr>
<tr><td>Code</td><td>EUAD01</td><td>Year of study</td><td colspan="3">1 (summer semester)</td></tr>
<tr><td>Course teacher</td><td>associate professor, Blanka Škrabić Perić, PhD
assistant professor, Tea Šestanović, PhD
professor, Zdravka Aljinović, PhD</td><td>Credits (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>26</td><td></td><td>26</td><td></td></tr>
<tr><td>Status of the course</td><td>Optional</td><td>Percentage of application of e-learning</td><td colspan="3">40%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Main aim is achieve the knowledge and the skills for understanding and performing time series and panel data methods in economic data analysis.
– level 6/7</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">-</td></tr>
<tr><td>methods</td><td colspan="5">Main learning outcome
Create economic (microeconomic and macroeconomic) models and use adequate time series and panel data models to estimate – level 6/7

Learning outcomes:
1.Choose and differentiate methods for time series and panel data analysis – level 6
2. Compare properties of different time series and panel data estimators-level 7
3. Argue properties of selected time series or panel data estimator
– level 7
4. Estimate parameters of theoretical model by using adequate software
– level 7
5.Evaluate and explain empirical results and perform diagnostics test – level 7
6. Forecast values of variable in the future periods – level 7</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5"><table>
<tr><td></td><td colspan="2">Lectures</td><td colspan="2">Exercises:</td></tr>
<tr><td></td><td>Topic</td><td>Hours</td><td>Topic</td><td>Hours</td></tr>
<tr><td></td><td>Time series decomposition and smoothing techniques Data filtering</td><td>2</td><td>Time series decomposition and smoothing techniques Data filtering</td><td>2</td></tr>
<tr><td></td><td>Autocorrelation and partial autocorrelation function and autoregressive models.</td><td>2</td><td>Autocorrelation ~~function~~ and partial autocorrelation function and autoregressive models.</td><td>2</td></tr>
<tr><td></td><td>Nonstationary time series. Unit root test. Testing for stationary.</td><td>2</td><td>Nonstationary time series. Unit root test. Testing for stationary.</td><td>2</td></tr>
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		Cointegration. Granger-Engle approach. Error-correction model. Equilibrium. Long and short run equation.	2	Cointegration. Granger-Engle approach. Error-correction model. Equilibrium. Long and short run equation.		2
		Multivariate time series. VAR models. Endogeneity. Granger causality test. Impulse response function and variance decomposition.	2	Multivariate time series. VAR models. Endogeneity. Granger causality test. Impulse response function and variance decomposition.		2
		Vector Error Correction Model (VECM) model. Johansen test and number of cointegration vectors	2	Vector Error Correction Model (VECM) model. Johansen test and number of cointegration vectors		2
		Introduction in panel data, Organization of panel data in statistical software, Pooled panel data and pooled OLS.	2	Introduction in panel data, Organization of panel data in statistical software, Pooled panel data and pooled OLS.		2
		The fixed effects model	2	The fixed effects model		2
		The random effects model	2	The random effects model		2
		F-test for fixed effects, LM test, Hausman test	2	F-test for fixed effects, LM test, Hausman test		2
		Introduction to dynamic panel data, Arellano Bond estimator,	2	Properties of dynamic panel data, Arellano Bond estimator,		2
		Blundell and Bond estimator	2	Blundell and Bond estimator		2
		Least Squares Dummy Variables corrected	2	Least Squares Dummy Variables corrected		2

Format of instruction	■ lectures ☐ seminars and workshops ■ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	■ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	Students are required to attend classes and actively participate in classes. Students' activity will be monitored through self-evaluation quizzes that will be available to students on the course websites within the Moodle platform. In case the student takes two self-evaluation quizzes during the semester and attends less than 50% of lectures and exercises, the student will be denied a signature. The condition for taking the exam is a signature.	

Screening student work *(name the proportion of*	Class attendanc	2	Research		Practical training	

ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	e					
	Experimental work		Report		Critical review	1 ECTS
	Essay				Self-evaluation quizzes (Other)	0.5
	Tests		Oral exam		Independent assignments (Other)	2.5
	Written exam	2.5*	Project		(Other)	

Grading and evaluating student work in class and at the final exam	During the course software package Stata will be for all exercises. During the course student has to write two independent assignments (100%). For final mark, both activities have to be successfully completed. Final grade is average of all activities (marks 2-5). Alternatively, student can pass the written exam during the exam period. Exam consists of empirical and theoretical tasks. Numerical scale of grades for written exam: 0-49 inadequate (1) 50-42 sufficient (2) 65-74 good (3) 76-89 very good (4) 90-100 excellent (5) *Students which get positive marks from three independent assignments don't write written exam.

Required literature (available in the library and via other media)	Title	Number of copies in the library	Availability via other media
	Bahovec, V., Erjavec, N., Uvod u ekonometrijsku analizu, Ekonomski fakultet Sveučilišta u Zagrebu, Element, 2009.	4	
	Ashley, R. A., Fundamentals of Applied Econometrics, John Wiley & Sons, New York, 2012	1	
	Škrabić Perić, B.; Statički panel modeli: primjena u analizi razvoja financijskog sustava zemalja srednje i istočne Europe, u Aljinović, Z., Arnerić, J., Čular, M., Gardijan, M., Katalinić, K., Kojić, V., Marasović, B., Pivac, S., Poklepović, T., Šego, B.	10	

Optional literature (at the time of submission of study programme proposal)	Books: Enders, W., Applied Econometric Time Series, John Wiley & Sons, New York, 2004. Verbeek, M., A Guide to Modern Econometrics, second edition, John Wiley & Sons, Chichester, 2006. Brooks, C., Introductory econometrics for finance, Cambridge University Press, New York, 2002.

	Articles: Škrabić Perić, Blanka; Konjušak, Nikola: HOW DID RAPID CREDIT GROWTH CAUSE NON- PERFORMING LOANS IN CEE COUNTRIES? // South East European Journal of Economics and Business, 12 (2017), 2; 73-84. doi:10.1515/jeb-2017-0019 Škrabić Perić, Blanka; Aljinović, Zdravka; Mamić, Hrvoje IMPORTANCE OF HIGHER EDUCATION AND INVESTMENT IN HIGHER EDUCATION IN CESEE COUNTRIES // Proceedings of the 14th International Symposium on Operational Research. SOR'17 / Zadnik Stirn, Lidija ; Kljajić Borštnar, Mirjana ; Žerovnik, Janez ; Drobne, Samo (ur.). Ljubljana: Bistisk, 2017. str. 561-566 Škrabić Perić, Blanka Have more profitable banks a more or a less risky lending policy? Empirical evidence from CEE countries // Prague Economic Papers (2018) Škrabić Perić, B. :'Do the most frequently used dynamic panel data estimators have the best performance in a small sample? A Monte Carlo comparison'// *Croatian Operational Research Review*, 10(1) (2019), pp. 45–55. doi: 10.17535/crorr.2019.0005. Škrabić Perić, Blanka; Rimac Smiljanić, Ana; Aljinović Zdravka: Credit risk of subsidiaries of foreign banks in CEE countries: Impacts of the parent bank and home country economic environment // North American Journal of Economics and Finance, 46 (2018), November; 49-69 doi:10.1016/j.najef.2018.03.009 Škrabić Perić, Blanka; Smiljanić Rimac, Ana:Derivatives Markets Development and Country Political Risk // SOR '21 proceedings : the 16th International Symposium on Operational Research in Slovenia / Drobne, S. ; Zadnik Stirn, Lidija ; Kljajić Borštnar, Mirjana. ; Povh, Janez ; Žerovnik, Janez (ur.). (ur.). Škrabić Perić, Blanka; Šimundić, Blanka; Muštra, Vinko; Vugdelija, Marijana The Role of UNESCO Cultural Heritage and Cultural Sector in Tourism Development: The Case of EU Countries // Sustainability, 13 (2021), 10; 5473, 14 doi:10.3390/su13105473 (međunarodna recenzija, članak, znanstveni) Škrabić Perić, Blanka; Rimac Smiljanić, Ana; Kežić, Iva: Role of tourism and hotel accommodation in house prices // *Annals of tourism research empirical insights*, 3 (2022), 1; 1-9. doi: 10.1016/j.annale.2022.100036 Muštra, Vinko; Škrabić Perić, Blanka; Pivčević, Smiljana: Cultural heritage sites, tourism and regional economic resilience // Papers in regional science, 102 (2023), 3; 465-482. doi: 10.1111/pirs.12731
Quality assurance methods that ensure the acquisition of exit competences	•Monitoring attendance and other obligations of students (teacher) •Control of Teaching (Vice-Dean) •Analysis of students' success in all subjects of study (Vice-Dean) •Student survey on the quality of teachers and teaching for each course of study (UNIST, Centre for Quality Improvement) •Exam administered by the subject teacher validates all the learning outcomes of the course. The contents of the exam are periodically reviewed. This revision is the basis for determining the adequacy of the ways of checking learning outcomes (Vice-Dean)
Other (as the proposer wishes to add)	