

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: Napredna ekonometrija
Course title: Advanced Econometrics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Informacijske znanosti, doktorski študijski program tretje stopnje	Poslovna informatika	Prvi ali drugi	Prvi ali tretji
Information Science third cycle Doctoral Study Programme	Business Informatics	First or Second	First or Third

Vrsta predmeta / Course type

Izbirni / Elective

Univerzitetna koda predmeta / University course code:

1-IZ-PI-DR-IP-NE-2022-01-28

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	20	/	/	/	270	10

Nosilec predmeta / Lecturer: prof. dr. Boris Podobnik

Jeziki / Languages: **Predavanja / Lectures:** Slovenski, angleški / Slovene, English
Vaje / Tutorial:

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Pogoj za pristop k pisnemu izpitu so pravočasno oddane in pozitivno ocenjene domače naloge.

Prerequisites:

Student has to submit homework assignments on time. If the homework assignments are positively graded, he/she is allowed to write the exam.

Vsebina:

Content (Syllabus outline):

<p>Narava ekonometrije in ekonomskih podatkov.</p> <p>Določena matematična orodja.</p> <p>Verjetnost in matematične statistike.</p> <p>Regresijski model:</p> <ul style="list-style-type: none"> • določanje cenilk po metodi najmanjših kvadratov (OLS) • Gauss-Markove predpostavke v enostavni regresiji. <p>Multipli regresijski model:</p> <ul style="list-style-type: none"> • ocenjevanje, • Gauss-Markove predpostavke v multipli regresiji in Gauss-Markov teorem, • sklepanje. <p>Multipla regresijska analiza: asimptotične lastnosti cenilk po metodi najmanjših kvadratov (OLS).</p> <p>Metoda najmanjših kvadratov v matrični obliki.</p> <p>Določanje cenilk po metodi najmanjših kvadratov v R.</p> <p>Težave s podatki in funkcionalna forma.</p> <p>Napovedovanje in analiza ostankov.</p> <p>Neizpolnjevanje klasičnih predpostavk: heteroskedastičnost in endogenost.</p> <p>Multipla regresijska analiza s kvalitativnimi informacijami: dvojiške (ali umetne) spremenljivke.</p> <p>Modeli omejenih odvisnih spremenljivk in popravki pri izbiri vzorca.</p> <p>Ekonometrično modeliranje s pomočjo R.</p>	<p>The nature of econometrics and economic data.</p> <p>Some mathematical tools.</p> <p>Probability and mathematical statistics.</p> <p>Regression model:</p> <ul style="list-style-type: none"> • OLS estimator, • Gauss-Markov assumptions for simple regression. <p>The multiple regression model:</p> <ul style="list-style-type: none"> • estimation, • Gauss-Markov assumptions for multiple regression and Gauss-Markov theorem, • inference. <p>Multiple regression analysis: OLS asymptotics</p> <p>OLS in matrix form.</p> <p>Implementation of the OLS estimator in R.</p> <p>Data problems and functional form.</p> <p>Prediction and residual analysis.</p> <p>Violation of classical assumptions: heteroscedasticity and endogeneity.</p> <p>Multiple regression analysis with qualitative information: binary (or dummy) variables.</p> <p>Limited dependent variable models and sample selection corrections.</p> <p>Step-by-step econometric modeling using R.</p>
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Temeljni literatura in viri / Readings:

<ul style="list-style-type: none"> • Wooldridge, J.M. (2019). <i>Introductory Econometrics, 7th edition</i>. Boston: Cengage Learning. • Marno, A. (2017). <i>A Guide to Modern Econometrics, 5th edition</i>. Hoboken: John Wiley & Sons. • Chipman, J. (2011). <i>Advanced Econometric Theory</i>, 1st edition. Routledge. • Podobnik, B.: Napredna ekonometrija – prosojnice s predavanj in gradiva z vaj, FIŠ, Moodle.
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Cilji in kompetence:**Splošne kompetence:**

- Sposobnost identificiranja danega raziskovalnega problema, njegove analize ter možnih rešitev.
- Sposobnost obvladanja standardnih metod, postopkov in procesov raziskovalnega dela na različnih znanstvenih področjih.
- Poznavanje pomena kakovosti in prizadevanje za kakovost strokovnega dela skozi avtonomnost, (samo)kritičnost, (samo)refleksivnost in (samo)evalviranje.

Predmetno-specifične kompetence:

- sposobnost pravilne izvedbe regresijske analize na osnovi presečnih podatkov in interpretacije njenih rezultatov
- sposobnost razvoja lastnega kritičnega in analitičnega mišljenja o ekonometričnih problemih v teoriji in praksi
- sposobnost uporabe novih tehnologij za izvedbo ekonometričnih analiz

Objectives and competences:**General competences:**

- Ability to identify a research problem, analyze it, and offer possible solutions.
- Mastery of standard research methods, procedures and processes in diverse scientific fields
- Familiarity with the notion of quality and strive for professional quality through autonomy, (self-) criticism, (self-) reflection and (self-) evaluation

Subject-specific competences:

- ability to correctly apply regression analysis on cross-sectional data and interpret its results
- ability to develop own critical and analytical thinking about econometric problems in theory and practice
- ability to apply new technologies to perform econometric analyses

Predvideni študijski rezultati:

Znanje in razumevanje:

Študenti bodo sposobni

- analizirati ekonometrične modele,
- ocenjevati različne linearne ekonometrične modele,
- raziskati ekonometrične tehnike in modele za ekonomsko analizo konkretnih realnih problemov,
- oceniti in analizirati ekonomske odnose s pomočjo ekonometričnih tehnik na logično konsistenten način.

Z računalniškimi seminarскими vajami na simuliranih in realnih podatkih v programskem okolju R bodo študenti sposobni uporabe ekonometričnih tehnik v praksi z namenom:

Intended learning outcomes:

Knowledge and understanding:

Students will be able to

- analyze econometric models,
- estimate various linear econometric models,
- examine econometric techniques and models for economic analysis in concrete real problems,
- evaluate and analyze economic relationships by applying econometric techniques in a logically consistent manner.

Through computer seminar exercises on simulated and, real data sets in R students will be able to apply econometric techniques in practice in order to:

- estimate sensible model specifications,
- draw inference, and

- ocenjevanja smiselnih specifikacij modela,
- sklepanja in
- reševanja računsko zahtevnih problemov.

- solve computationally demanding problems.

Metode poučevanja in učenja:

- *Predavanja z aktivno udeležbo študentov* (razlaga, diskusija, vprašanja, primeri, reševanje problemov);
- *Seminarske vaje*, kjer študentje na primerih ponovijo temeljne koncepte, predstavljene na predavanjih, se naučijo oblikovati in ocenjevati ekonometrične modele ter se naučijo uporabljati programsko opremo R.

Learning and teaching methods:

- *Lectures with active participation by the students* (explanation, discussion, questions, cases, problems solving);
- *Seminar tutorials*, where students will recall, reinforce, and shed light on the concepts and methods introduced at lectures, and will learn to design and estimate econometric models, as well as to use R software.

Delež (v %) /

Načini ocenjevanja:

Weight (in %) Assessment:

Način (pisni izpit, ustno izpraševanje, naloge, projekt):	Delež (v %) / Weight (in %)	Assessment:
Pisni izpit	100 %	Type (examination, oral, coursework, project): Written Exam

Reference nosilca / Lecturer's references:

- PODOBNIK, Boris, CRAWFORD, G. Christopher, LICHTENSTEIN, Benyamin B., LIPIĆ, Tomislav, WILD, Dorian, ZHANG, Xin, STANLEY, H. Eugene. The new wealth of nations : how STEM fields generate the prosperity and inequality of individuals, companies, and countries. *Chaos, solitons and fractals*. [Print ed.], December 2020, vol. 141, str. 1-8, ilustr. <https://doi.org/10.1016/j.chaos.2020.110323>, doi: 10.1016/j.chaos.2020.110323.
- PODOBNIK, Boris, MUSURA GABOR, Andrijana, ŠKREBLIN KIRBIŠ, Ivona. Scale-free growth of human society based on cooperation and altruistic punishment. *Physica. A, Statistical mechanics and its applications*, ISSN 0378-4371. [Print ed.], 2019, vol. 513, str. 613-619, ilustr., doi: 10.1016/j.physa.2018.08.170.
- KOVAČ, Dejan, SCRBEČ, Nikol, PODOBNIK, Boris. Does it payoff to research economics: a tale of citation, knowledge and economic growth in transition countries. *Physica. A, Statistical mechanics and its applications*, ISSN 0378-4371. [Print ed.], 2018, vol. 505, str. 293-305, ilustr., doi: 10.1016/j.physa.2018.02.171.