Study program: Doctoral Academic Studies in Biomedical Sciences

Name of the subject: APPLICATION OF ADVANCED STATISTICAL METHODS IN BIOMEDICAL SCIENCES

Teacher(s): Petar D. Čolović, Dejan M. Pajić, Tanja D. Jevremov, Nina R. Brkić Jovanović, Tatjana Z. Krstić, Vojislava V. Bugarski Ignjatović

Status of the subject: compulsory

Number of ESPB points: 5

Condition: -

Goal of the subject

Enable the graduate students to a) competently choose the appropriate statistical procedures for complex research designs b) analyze the data for research reports and scientific publications. Train the graduate students to perform data analyses using open statistical software. Critical reading of professional and scientific literature aimed at understanding and adequate application of statistical procedures in biomedical research.

Outcome of the subject

Knowledge: Statistical description and analysis of the data by applying the appropriate statistical procedures.

Skills: Conducting multivariate statistical analyses. In line with the research goals and data features, application of the appropriate analytic techniques, and presentation of the results in professional and scientific publications.

Content of the subject

Theoretical lectures

Complex models of relations among variables 1: mediation and moderation models – 5 classes; Complex models of relations among variables 2: General linear model – univariate and multivariate analysis of covariance, within-subjects linear models – 5 classes; Group differences in multivariate context: multivariate analysis of variance, binary and multinomial logistic regression, canonical discriminant analysis – 5 classes; Survival analysis – 5 classes; Data reduction and latent structure: principal components and factor analysis – 5 classes; Grouping of research objects: cluster analysis and related procedures – 5 classes

Practical lectures

Application of the advanced statistical procedures with open statistical software, and open and simulated data; 1: parallel and serial mediation, moderation, moderated mediation models – 5 classes; univariate and multivariate analysis of covariance, within-subjects linear models – 5 classes; multivariate analysis of variance, binary and multinomial logistic regression, canonical discriminant analysis – 5 classes; survival analysis – 5 classes; principal components and factor analysis – 5 classes; cluster analysis and related procedures – 5 classes

Recommended literature

1. HERZOG, M. F., Herzog, M. H., Francis, G. S., & Clarke, A. (2019). *Understanding Statistics and Experimental Design: How to Not Lie with Statistics*. Springer. https://www.doabooks.org/doab?func=fulltext&uiLanguage=en&rid=43708
2. Ewens, W. J., & Grant, G. R. (2006). *Statistical methods in bioinformatics: an introduction*. Springer Science & Business Media.
3. Riffenburgh, R. H. (2006). Statistics in medicine 2nd ed. Boston, US: Elsevier Academic Press.
4. van de Schoot, R., & Miočević, M. (Eds.). (2020). *Small Sample Size Solutions (Open Access): A Guide for Applied Researchers and Practitioners*. Routledge.
5. Navarro, D., Foxcroft, D., Faulkenberry, T., (2019), Learning Statistics with JASP: A Tutorial for Psychology Students and Other Beginners. https://learnstatswithjasp.com/
6. Navarro, D.J., & Foxcroft, D. R. (2019). learning statistics with jamovi: A tutorial for psychology students and other beginners. (Version 0.7). DOI: 10.24384/hgc3-7p15

Number of active classes	**Theory:** 60	**Practice:** 30

Methods of delivering lectures

Classes, seminars

Student activity assessment (maximally 100 points)

лectures: 30

written exam; 70