

## Course Description

### PSYM17-205 Advanced Statistics and Data Analysis

#### Aim of the course

**Aim of the course:** Students are introduced to the most common multivariate analyses used within the field of psychology. This course is designed to provide students with a working knowledge of the basic concepts underlying the most important multivariate techniques, with an overview of actual applications.

#### Learning outcome, competences

knowledge:

students are expected to know the most frequently used multivariate statistical analyses in psychological research and their practical applications and applicability

students are expected to know the assumptions of the most frequently used multivariate statistical analyses

students are expected to know how to report the learned analyses in APA

format students are expected to know the limitations of the learned analyses

attitude:

students are expected to gain confidence in making their own decisions about statistical procedures

students are expected to think creatively and flexibly while applying the learnt knowledge in practice

skills:

We aim to prepare students to use their statistical knowledge flexibly and be able to compose their MA theses.

Students are acquiring the judicious selection of analyses, with the applicability and interpretation of them

#### Content of the course

##### Topics of the course

Introduction to multivariate statistics and multivariate data. Correlation and simple linear regression analysis.

Multiple linear regression

analysis. Logistic regression

analysis.

Introduction to analysis of variance (ANOVA).

Factorial ANOVA, analysis of covariance (ANCOVA)

Multivariate analysis of variance (MANOVA)

Principal component analysis and exploratory factor analysis.

To fulfil the students' interest the following topics could also be covered optionally: hierarchical cluster analysis, non-hierarchical cluster analysis, discriminant analysis, analyzing missing data, residual analysis, configuration analysis, introduction to multilevel linear models, confirmatory factor analysis.

#### Learning activities, learning methods

interactive lecture is the method of instruction

students are acquiring the judicious selection of analyses, with the usage and interpretation of them through several educatory examples

students get Power Point presentations and detailed written handouts of the material

#### Evaluation of outcomes

## Learning requirements, mode of evaluation, and criteria of evaluation:

The grade consists of the result of the final exam that should have to be passed

mode of evaluation:

5-level grading, based on the achieved scores in percentages

criteria of evaluation:

GRADING based on scores achieved:

0-50 % = 1 (failed)

51-65 % = 2 (passed)

66-79 % = 3

80-89 % = 4

90-100 % = 5

### Reading list

#### Compulsory reading list

- Field A. (2013). *Discovering Statistics Using IBM SPSS Statistics 4th edition*, Sage Publications. Chapter 4. – Exploring Data with graphs pp. 121-163.  
Chapter 5. – The beast of bias pp. 163-211.  
Chapter 7. – Correlation pp. 270-292.  
Chapter 8. – Regression pp. 314-356. Chapter  
19. – Logistic regression pp. 775-799.  
Chapter 11. – Comparing several means: ANOVA (GLM 1) pp. 460-477.  
Chapter 12. – Analysis of covariance, ANCOVA (GLM 2) pp. 488-506.  
Chapter 13. – Factorial ANOVA (GLM 3) pp. 520-542.  
Chapter 14. – Repeated-measures designs (GLM 4) pp. 555-590.  
Chapter 16. – Multivariate Analysis of Variance – MANOVA pp. 623-664.  
Chapter 17. – Exploratory factor analysis pp. 686-706.

#### Recommended reading list

- Tabachnick, B. G., & Fidell, L. S. (2012). *Using multivariate statistics* (6th ed.). Boston: Pearson Education.
- Brown, T. A. (2006). *Confirmatory Factor Analysis for Applied Research*, The Guilford Press, 40-156.
- Field A. (2013). *Discovering Statistics Using IBM SPSS Statistics 4th edition*, Sage Publications.
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- Chapter 20. Multilevel linear models pp. 814-866.
- Vargha, A., Torma, B. & Bergman, L. R. (2015). ROPstat: a general statistical package useful for conducting person-oriented analyses. *Journal for Person-Oriented Research*, 1 (1-2), 87-98. [http://www.person-research.ouradmin.se/articles/volume1\\_1\\_2/filer/20.pdf](http://www.person-research.ouradmin.se/articles/volume1_1_2/filer/20.pdf)
- Vargha, A., Bergman, L. R. & Takács, S. (2016). Performing cluster analysis within a person-oriented context: Some methods for evaluating the quality of cluster solutions. *Journal for Person-Oriented Research*, 2 (1-2), 78-86. DOI: 10.17505/jpor.2016.08. [http://www.personresearch.ouradmin.se/articles/volume2\\_1\\_2/filer/5.pdf](http://www.personresearch.ouradmin.se/articles/volume2_1_2/filer/5.pdf)