SYLLABUS

1. Information about the study program

1.1 Higher education institution	Babeș-Bolyai University
1.2 Faculty	Faculty of Psychology and Educational Sciences
1.3 Department	Department of Psychology / Department of Clinical Psychology
1.4 Field of study	Psychology - Cognitive Sciences
1.5 Study cycle	Bachelor level
1.6 Study program / Qualification	Psychologist

2. Information about the course

2.1 Title of the course	Quantitative research methods and data analysis II						
2.2 Teacher in charge of the lecture	Associated professor Robert Balaszi, Ph.D.						
2.3 Teacher in charge of the seminar	Senior assistant professor Silviu Matu, Ph.D.						
2.4 Study year	I	2.5 Semester	II	2.6. Examination type	Final exam	2.7 Course type	Mandatory

3. Estimated total time (number of hours of teaching activities per semester)

3.1 Number of hours per week	4	out of which: 3.2 lecture	2	3.3 seminar / laboratory	2
3.4 Total number of hours in the curriculum	56	out of which: 3.5 lecture	28	3.6 seminar / laboratory	28
Distribution of the allocated amount of time:					hours
Individual study (textbook, course support, bibliography, and notes)					30
Supplementary documentation at the library using specialized electronic platforms in the field					24
Preparing for seminars / laboratories, homework, papers, portfolios, and essays					10
Tutoring					6
Exams					2
Other activities: research activities					0

3.7 Total number of hours of individual study	70
3.8 Total number of hours per semester	128

3.9 Number of credits (ECTS)	5

4. Prerequisites (if applicable)

4.1 Curriculum	Basic knowledge of research methods in cognitive science/psychology (Quantitative research methods and data analysis I)
4.2 Competencies	English language

5. Requirements (if applicable)

5.1 For the lecture	• Classroom with at least 180 seats, computer and video projector / Online course conducted through the MS Teams platform.
5.2 For the seminar / laboratory	• Room with at least 50 seats, computer and video projector / Online seminar conducted through the MS Teams platform; computers with data analysis software Excel and JASP.

6. Specific skills acquired

Professional skills	**Knowledge and understanding** • Has good knowledge of different research designs, including their advantages and disadvantages. • Has good knowledge of the steps in designing an experimental study. • Understand the limitations imposed by the research goals and the practical conditions of a study on the way in which variables are being operationalized. **Explanation and interpretation** • Explains the advantages and disadvantages of main experimental research methods. • Explains correctly how the results of an experimental/quasi-experimental study should be interpreted. • Being able to interpret correctly the results of an multifactorial experimental design. **Instrumental - applicative** • Designing an experimental/quasi-experimental study by adequately defining the dependent and independent variables as reflected in the experimental manipulation. • Identifying possible confounding variables and interpreting the results in accordance with the alternative explanations based on the condition in which the study was conducted. **Attitude** • Expressed interest towards empirical research. • Promotes scientific rigor in designing a study, collecting the data, analysing the data and inwriting the results.

Transversal skills	● Being able to effectively work in small groups. ● Being able to effectively use the available information and the resources including the references and the statistical software. ● Expressing a responsible attitude towards the professional field and the importance of science. ● Expressing a responsible attitude towards the ethical practices in scientific research.

7. Objectives of the course (based on the grid of acquired competencies)

7.1 General objective	• Having the knowledge on how to design an experiment/quasi-experiment, how to conduct inferential analysis and interpret the results. • Developing the skills to design an experiment/quasi-experiment and to write a research proposal. • Developing the skills to conduct inferential data analysis and correctly intercepting the results.
7.2 Specific objectives	• Identifying the essential elements of an experiment/quasi-experiment. • Correctly identifying the variables employed by a study (i.e., the dependent and the independent variables). • Interpreting the results from a experimental/quasi-experimental study.

8. Content

8.1 Lecture	Teaching strategies	Remarks
1. Introductory course; setting expectations, discussing the syllabus and the minimum requirements. **Keywords**: administrative activities; syllabus	Lecture, guided discovery, debate, inquiry	
2. Scientific experiment and its types. Experimental designs with independent samples. Types of experimental control. Interval validity. **Keywords**: experiment; independent samples; internal validity	Lecture, guided discovery, debate, inquiry	
3. Scientific experiment and its types. Experimental designs with paired samples. Types of experimental control. Interval validity.	Lecture, guided discovery, debate, inquiry	

Keywords: experiment; paired samples; internal validity		
4. Statical inference. How to test hypothesis. **Keywords**: statistical inference; type-I error	Lecture, guided discovery, debate, inquiry	
5. Formulating statistical hypotheses; applications in experimental research with independent and paired samples **Keywords**: statistical inference; hypothesis	Lecture, guided discovery, debate, inquiry	
6. Additional issues with testing hypotheses: effect size and statistical power. **Keywords**: effect size; statistical power; type-II error	Lecture, guided discovery, debate, inquiry, demonstration, problem solving, mathematical modeling	
7. Complex experimental and quasi-experimental designs **Keywords**: multi-factorial designs	Lecture, guided discovery, debate, inquiry	
8. One-way analysis of variance (ANOVA) for independent samples **Keywords**: One-way ANOVA	Lecture, guided discovery, debate, inquiry	
9. Post-hoc and a priory analysis in factorial designs **Keywords**: post-hoc analysis	Lecture, guided discovery, debate, inquiry	
10. Bifactorial ANOVA – main and interaction effects **Keywords**: Two-way ANOVA; main effect; interaction effect	Lecture, guided discovery, debate, inquiry	
11. One-way repeated measures ANOVA **Keywords**: Repeated measures	Lecture, guided discovery, debate, inquiry	
12. Idiographic research in psychology: single case experiments and study cases	Lecture, guided discovery, debate, inquiry	

Keywords: single case experiment; case study		
13. Nonparametric statistical analysis: nominal, ordinal and scale measurements **Keywords**: nonparametric analysis; ranks	Lecture, guided discovery, debate, inquiry	
14. Final revision and preparation for the exam	Inquiry	
Mandatory references: • Shaughnessy, J. J., Zechmeister, E. B. & Zechmeister, J. (2012). Research methods in psychology. (Ninth Edi.). NY: McGraw Hill. • Cohen, B. (2001) Explaining psychological statistics. John Wiley & Sons, New York. • Leary, M. (2001) Introduction to Behavioral Research Methods. Allyn & Bacon, Boston **Optional references:** • Coolican, H. (2004) Research Methods and Statistics in Psychology. Oxford University Press. • Grazziano, A. (1993) Research methods. A process of inquiry.		
8.2 Seminar / laboratory	Teaching strategies	Remarks
1. Analyzing an experiment from cognitive sciences. **Keywords:** independent variable; dependent variable	Practical applications, discussion, debate, modeling.	
2. Analyzing the effects of a possible confounding variable on the interpretation of the results coming from a between-subjects experimental design. **Keywords:** confounding variable	Practical applications, discussion, debate, modeling.	
3. Analyzing the effects of a possible confounding variable on the interpretation of the results coming from a within-subjects experimental design. **Keywords:** confounding variable	Practical applications, discussion, debate, modeling.	
4. Inferential statistics with one sample.	Practical applications, discussion, debate, modeling.	

Keywords: one sample t test		
5. Inferential statistics when working with two dependent or independent samples **Keywords:** student t	Practical applications, discussion, debate, modeling.	
6. Calculating effect sizes in experimental research **Keywords:** Cohen's d	Practical applications, discussion, debate, modeling.	
7. Controlling the effect of confounding variables in complex experimental and quasi-experimental research designs **Keywords:** confounding variable	Practical applications, discussion, debate, modeling.	
8. Calculating and interpreting the F statistics for a unifactorial between-subjects design **Keywords:** F statistic, sum of squares, F distribution	Practical applications, discussion, debate, modeling.	
9. Calculating and interpreting the F statistics for a unifactorial within-subjects design **Keywords:** F statistic, sum of squares, F distribution	Practical applications, discussion, debate, modeling.	
10. Calculating and interpreting the F statistics for a multi-factorial between-subjects design **Keywords:** F statistic, sum of squares, F distribution	Practical applications, discussion, debate, modeling.	
11. Analyzing a quasi-experimental design: Berenbaum & Hines (1992) Early androgens are related to childhood sex-typed toy preferences. **Keywords:** Berenbaum study	Practical applications, discussion, debate, modeling.	
12. Case-study vs. single case research	Practical applications, discussion, debate, modeling.	

Keywords: single case experiment; case study		
13. Using nonparametric statistics for analyzing the data from a small sample experiment **Keywords:** non-parametric statistics; rank; Mann-Whitney; Kruskal-Wallis	Practical applications, discussion, debate, modeling.	
14. Practicing the examination procedure and final review of the contents	Practical applications, discussion, debate, modeling.	
Mandatory references: • Radu, I., Miclea. M., Albu, M. Nemes, S. Moldovan, O., Szamoskozi, S. (1993) Metodologie Psihologica si analiza datelor. Editura Sincron, Cluj Napoca. • MacLin, K. M. and Solso, R. L. (2010) Experimental psychology: a case approach. Pearson Edition, Boston. • Goss-Sampson, M. A. (2020). Statistical Analysis in JASP 0.12: A Guide for Students. April 2020.		

9. Correlations between the content of the course and the expectations of the representatives of the epistemic community, professional associations and representative employers in the field related to the program

The topics of the lectures and seminars are relevant for gaining basic skills in conducting research and analyzing data in the field of cognitive sciences, covering the common practices presented in the literature. The knowledge and the competencies that will be acquired will allow the students to conduct research activities and correctly interpret the results from the scientific literature.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight in the final grade
10.4 Lecture	Correct, logical and coherent application of the concepts learned. Logical and accurate explanation and interpretation of the results.	Written exam	60%
10.5 Seminar / laboratory	Being able to work with the knowledge covered by the course.	Research project	40%

	Translating the knowledge to a actual project. Critical thinking. Inquiry on basic concepts in research methods.		

10.6 Minimum passing score

The final grade consists of:

a. score obtained in the written exam in proportion of minimum 50%

b. total score of the student including both the exam and the project should be of at least 5 out of 10 points.

Date: 22.11.2021

Signature of the teacher in charge of the lecture

Associated professor Robert Balaszi, Ph.D.

Signature of the teacher in charge of the seminar

Senior assistant professor Silviu Matu, Ph.D.

Approval date in the department

Signature of the Head of the department /director