Course Title	Advanced Methods in Quantitative Research				
Course Code	EDG720				
Course Type	Compulsory				
Level	Doctorate (3rd Cycle)				
Year / Semester	1st year / 1st semester				
Teacher's Name	TBA				
ECTS	10	Lectures / week	3 Hours /14 Weeks	Labs / week	N/A
Course Purpose and Objectives	The course aims at the development of doctoral students' deep understanding and appreciation of the philosophical underpinnings and main principles underlying quantitative research, and of the relation between quantitative and qualitative research paradigms. It also aims at acquainting students with various advanced statistical methods, and with how these could exploited to investigate educational phenomena and issues. At the same time, the course aims to provide doctoral students with the knowledge and skills required to pose research questions requiring a quantitative approach, to collect data (whenever deemed necessary), to record and analyze empirical data using appropriate statistical software packages and techniques, and to interpret and present the results of a statistical analysis in a research report. Finally, the course aims to develop doctoral students' ability to critically interpret and evaluate quantitative research studies in the field of education or in the broader area of social research.				
Learning Outcomes	Upon successful completion of this course students should be able to: • Analyse the relationship between epistemology, theory, methodology and methods in quantitative, qualitative and mixed educational research • Identify and justify the most appropriate research approach to address an identified educational problem, issue, or knowledge need • Design a quantitative study by setting research aims and questions and selecting appropriate methods and techniques to respond to these aims and questions • Collect quantitative data with appropriate techniques and use statistical analysis software packages to record, process and analyse research data by applying advanced statistical methods • Critically analyze and discuss the potential of various quantitative methodologies, but also key epistemological and methodological issues raised in quantitative methodologies • Be critical readers of quantitative research findings in the field of education • Identify and address ethical issues related to quantitative research in an educational context				

Prerequisites	EDG681 or equivalent course	Co-requisites	None
Course Content	• The nature of educational research – ontological, epistemological, and methodological assumptions in relation to the various schools of thought • Quantitative educational research: role, societal impact, similarities and differences compared to qualitative and mixed research methods • Analyse the relationship between epistemology, theory, methodology and methods in quantitative, qualitative and mixed educational research • Historical overview of the evolution of quantitative research methods and techniques • Issues of validity, reliability and research ethics in quantitative research • Formulation of research questions and statistical hypotheses; • Probability, probability models, sampling, principles of inferential statistics; • One-sample and two-sample hypothesis testing regarding the mean, proportion, and dispersion • Assumptions underlying parametric tests, statistical power, effect size, required sample size • Non-parametric statistical tests; • Correlation Analysis, Correlation Analysis Coefficients • Regression analysis: Simple, multiple, curvilinear, logistic • Analysis of Variance (ANOVA), Analysis of Covariance (ANCOVA), Multivariate Analysis of Variance (MANOVA) • Factor analysis, principal component analysis • Multidimensional scaling, clustering, discriminant analysis • Structural equation modeling and latent class modeling • Hierarchical linear models • Categorical data analysis • Meta-analysis • Statistical software packages for recording, processing and analyzing data through the application of advanced statistical methods • Examples of quantitative research studies published in the field of education		
Teaching Methodology	In a computer laboratory		

<table>
<tr><td>Bibliography</td><td>
Anthony, D. (2014). Statistics for Health, Life and Social Sciences. BookBoon ISBN: 978-87-7681-740-4. Online: http://www.e-booksdirectory.com/details.php?ebook=6674

Chatterjee, S., & Hadi, A. S. (2012). Regression Analysis by Example (5th edition). New York, NY: John Wiley & Sons.

Johnson, R. A., & Wichern, D. W. (2007). Applied Multivariate Statistical Analysis (6th edition). Upper Saddle River, NJ: Prentice Hall.

Muijz, D. (2011). Doing Quantitative Research in Education with SPSS. Sage: London. ISBN 0-7619 4382-X.

Rayner, J.C.W. (2016). Introductory Nonparametrics. Bookboon. ISBN: 978-87-403-1475-5. Available Online: http://bookboon.com/en/introductory-nonparametrics-ebook

Schumacker, R. E., & Lomax, R. G. (2010). A Beginner's Guide to Structural Equation Modeling (3rd edition). U.K.: Routledge
</td></tr>
<tr><td>Assessment</td><td>
<table>
<tr><td>Exams</td><td>40%</td></tr>
<tr><td>Assignments</td><td>60%</td></tr>
<tr><td></td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Language</td><td>English</td></tr>
</table>