**Syllabus**

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| **Instructor's name:** | Agnes Stancel-Piątak |
| **Course title:** | Hierarchical Linear Modeling with Large Scale Assessment Data with Mplus |
| **Course type:** | Workshop |
| **Number of credit hours per edition:** | 30 x 45 min (workshop) |
| **ECTS** | 3 ECTS |
|  | Workshop:30h |
| **Software to be used:** | Mplus software |
| **Teaching day schedule preferences:** | *Day 1*  *3 x 90 min – sessions with 1 x 15 min breaks and 1 x 90 min lunch break*  *Day 2-4*  *4 x 90 min – sessions with 2 x 15 min breaks and 1 x 90 min lunch break* |
| **Knowledge** | After After this workshop, students will possess **knowledge** regarding:   * Basic theory of HLM * Different models in HLM and their specifications for testing hypotheses * Practical applications of HLM to Large Scale Assessment data with a specific set of methods |
| **Abilities** | After After the course students will have the **abilities** to:   * Correctly apply hierarchical analysis with large scale data, using plausible values, sampling weights, etc. * Specify and estimate models using Mplus software * Justify the model goodness of fit * Interpret the results of two-level and three-level models * Test hypotheses using Hierarchical Linear Modeling (HLM) |
| **Social competences** | Is able to communicate the knowledge of the workshop in a simple way |
| **Course objectives:** | This workshop will cover the knowledge regarding conceptual and theoretical underpinnings of the Theory of Hierarchical Linear Modeling (HLM). It will guide participants on how to apply specific issues related to HLM of Large Scale Data (weighting, scaling, plausible values). It will train participants on how to use of Mplus software to correctly apply hierarchical analysis with large scale data and to specify and estimate models. The participants will understand the issues of variance decomposition, fit indices of hierarchical models, model choice and model comparisons. Participants will also learn about the possibilities and complexities of the HLM method in hypothesis testing.  During the course, students will develop their **attitudes** related to:   * Critical interpretation and justification of HLM analysis presented in the current research * Recognitions of possibilities and complexities of the method in hypothesis testing * Understanding the implications, advantages and limitations of the method |
| **Prerequisites:** | Basic statistical concepts and SPSS  An understanding of methods of inferential statistics (regression, correlation, and variance analysis) |
| **Pass requirements:** | Actively participate during presentations in workshop  Actively participate in hands-on trainings  Develop hypothesis and analysis plan and implement the models with Mplus  Present results of above listed exercises to the colloquium |
| **Recommended reading:** | Ferron, J., Hess, M. R., Hogarty, K. Y., Dedrick, R. F., Kromrey, J. D., Lang, T. R., and Niles, J. (2004). *Hierarchical Linear Modeling: A Review of Methodological Issues and Applications*: 2004 annual meeting of the American Educational Research Association, San Diego, April 12-16. Retrieved from: <http://www.coedu.usf.edu/main/departments/me/documents/hml.pdf>  Raudenbush, S. W. & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park: Sage Publications.  Hox, J. J. (2008). *Multilevel analysis. Technics and applications*. New York: Psychology Press.  Information on how to use Mplus:  Muthén & Muthén -- Home Page. (2013). Retrieved December 11, 2013, from <http://www.statmodel.com/>  Institute for digital research and education: <http://www.ats.ucla.edu/stat/mplus/> |
| **Course plan:** | **Exercise 1**  Aim: Hands-on-trainings – Running different models with a prepared data set  Outcome: Participants will learn to run different models in Mplus and to read the output  Form: group-work  **Exercise 2**  Aim: Interpretation and discussion on the results of analyses conducted with Mplus  Outcome: Participants learn to interpret and justify the results of analyses. Also possible model modifications are discussed  Form: colloquium  **Exercise 3**  Aim: Development of hypothesis  Outcome: Applying the knowledge on HLM and on sampling design (from previous trainings) participants will learn, how to develop a new research question and an analysis plan  Form: group-work/individually  **Exercise 4**  Aim: Data preparation for Mplus and analysis with HLM  Outcome: Participants will learn how to prepare an appropriate data set with SPSS and how to apply the analysis of earlier developed hypothesis with Mplus.  Form: group-work/individually  **Exercise 5**  Aim: Interpretation and critical justification of the results  Outcome: Participants learn, how to choose the best model, to interpret it and also how to justify the contribution of the analysis to existing research considering the limitations of the method  Form: group work/colloquium |