Syllabus:

1. Introduction.

2. Topics covered and resources.
   - literature,
   - software.

3. The goals of a missing data analysis.
   - aims of ‘conventional’ analyses,
   - aims of statistical analyses with missing data.

4. The problem and types of missing data.
   - what is relevant to focus on when faced with missing data (pattern and mechanisms of missing data),
   - missing completely at random (MCAR), observed at random (OAR),
   - sufficient and necessary conditions, and what is necessary for MCAR,
   - how to check for OAR,
   - analysis of MCAR data,
   - missing at random (MAR),
   - ignorable missingness and nonignorable missingness

5. Traditional ways of dealing with missing data.
   - listwise deletion,
   - pairwise deletion,
   - dummy variable adjustment,
   - simple imputation methods (unconditional and conditional fill-in, hot-deck imputation),
   - weighting.

6. Full information maximum likelihood (FIML) in the presence of missing data.
   - why is it meaningful,
   - likelihood function for an incomplete data set,
   - fitting models to data using FIML,
   - examples of FIML applications,
     - fitting the general linear model with missing data,
     - a brief introduction to Mplus,
. longitudinal data analysis with incomplete data,
. the intercept and slope (IS) model for longitudinal data,
. individual trajectories of temporal development,
. a simple regression model for change over time,
. centering of time and intercept interpretation,
. an empirical application of the IS model,
. inclusion of ‘informative’ correlates of missing values as predictors.

- model choice in nationally representative longitudinal research with incomplete data sets.

7. Multiple imputation
   - what is multiple imputation (MI),
   - how does MI work,
     . simple setting,
     . general setting,
   - illustrations of MI
     . analysis of missing data with predictors/covariates measured without error,
     . analysis of missing data using predictors/covariates measured with error,
   - integration of imputation and model fitting in single software (Mplus).

8. Conclusion.