Annex no. 3

to the Ordinance of the Rector of the Jagiellonian University of June 18, 2012

Class syllabus at PhD study programmes

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| Class name | Introduction to Bayesian data analysis |
| Name of the unit offering the class | **Instytute of Psychology** |
| The language of instruction  | English |
| Learning outcomes for the class: knowledge, skills and social competences | In this course, students will learn the basics of Bayesian inference. Both the R programming environment and the Stan modeling language will be used extensively. The end-goal is that students will learn how to formulate (some) research questions in the form of a Bayesian model or a contrast defined over the parameters of some Bayesian model, and will learn how to obtain answers in the form of a posterior distribution over the quantities of interest.Knowledge:- frequentist vs Bayesian inference- exponential family distributions as versatile building blocks- priors – their uses and their limitations- attaching a (possibly hierarchical) linear regression structure using link functions- hierarchical (mixed, multilevel) models- robust inference- basic sensitivity analysis- basic meta-analysis- [optional] combining Bayesian inference with causal inferenceSkills:Ability to perform basic Bayesian analyzesSocial competences: Ability to collaborate when performing statistical analyzes |
| Class type: (obligatory/optional) | Optional |
| Semester/year | **II** |
| Name and surname of the teacher(s) | Borysław Paulewicz |
| Name and surname of the examiner(s) if the teacher is not the examiner | Borysław Paulewicz |
| Mode | Seminar, workshop |
| Preliminary and additional requirements  | Basic statistical analysis |
| ECTS points awarded for the class | 3 |
| ECTS balance | *Contact hours – 30**Homeworks - 30 hours**Preparation of a final assignment – 30 hours* |
| Teaching methods  | Workshop |
| Testing and assessment methods used to check the achievement of the learning outcomes  | Practical exam at the computer. |
| The form and conditions for passing the class, including the thresholds for taking the exam/final test | 60% of correct answers. |
| The topics covered in class\* | - frequentist vs Bayesian inference- exponential family distributions as versatile model-building blocks- priors – their uses and their limitations- attaching a (possibly hierarchical) linear regression structure using link functions- hierarchical (mixed, multilevel) models- robust inference- basic sensitivity analysis- basic meta-analysis- [optional] combining Bayesian inference with causal inference |
| List of obligatory and additional reading \* | Statistical Rethinking wyd. 2. Richard McElreath\*Bayesian Data Analysis wyd. 3 Gelman et. al.\*Data Analysis Using Regression and Multilevel/Hierarchical Models Gelman & Hill\*Bayesian Cognitive Modeling Lee & Wagenmakers\*Doing Bayesian Data Analysis, Kruschke[\* is recommended, nonobligatory reading] |

\* In particularly justified cases general information will be sufficient.