

# University of Modena and Reggio Emilia

**Department of Biomedical, Metabolic and Neural Sciences**

**PhD modul: Clinical an Experimental Medicine – CEM – Medicina Clinica e Sperimentale**

**Course: Statistical design of experiments Academic year**

## Period:

## Lecture time: hours

## Course location:

## Examination: Group assignment - presentation of the research protocol for predefined experimental study

Director of the course: Prof. Giuseppe Biagini Course coordinator: Olivera Djuric, MD MSc

If you have specific questions about the contents of the course, please contact the course coordinator: Olivera Djuric, MD MSc

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**Course Programme**

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| Date | Topic | Hours |
| DAY 1 | Part I  Lecture: Principles of causation: causal inference, directed acyclic graphs, relation between variables (bias, confounding, effect modification)  Part II  Lecture: Overview of epidemiological study designs Group assignment - problem solving  Part III  Lecture: Basics of experimental studies  Theoretical exercise on types of experiential studies and types of clinical trials | 1h  45min 30min  1h 15min 30min |
| DAY 2 | Part I  Lecture: Principles of statistical inference  Group assignment - statistical vs. clinical inference  Part II  Lecture: Sample size and Power calculation  Practical exercise on calculating power and sample size for experimental study  Part III  Lecture: Choice of adequate statistical test Group assignment - problem solving  Part IV  Practical exercise in SPSS or STATA | 1h 15min  30min 15min  45min 30min  45min |
| DAY 3 | Part I  Lecture: Basics of correlation – use and missuse Theoretical exercise – correlation  Part II  Lecture: Regression – basic principles  Lecture: Linear regression and multiple linear regression  Part III  Practical exercise in SPSS or STATA | 40min 20min  45min 1h 30min  45min |
| DAY 4 | Part I  Lecture: Logistic regression – basic concepts | 30min |

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|  | Lecture: Single and multiple logistic regression | 45min |
| Part II  Lecture: Logistic regression – variable selection and model building Lecture: Logistic regression – statistical adjustment – interaction and confounding  Lecture: Logistic regression – diagnostics | 45min 45min  30min |
| Part III  Practical exercise in SPSS or STATA | 45min |
| DAY 5 | Part I  Lecture: Statistical analysis in experimental design - intention to treat analysis, primary and subgroup analysis | 45min |
|  | Part II  Lecture: analysis of variance (ANOVA) and covariance (ANCOVA) Lecture: repeated measures analysis  Lecture: time to event analysis – comparing survival curves | 45min 45min 1h |
|  | Part III  Practical exercizes in SPSS or STATA | 45min |
| DAY 6 | Presentation and discussion of a protocol for the experimental study  assigned in day one | 2h + 2h |