



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

University of Modena and Reggio Emilia

Department of Biomedical, Metabolic and Neural Sciences

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

Course: Statistical design of experiments

Academic year 2020 – 2021

Director of the course: Prof. Giuseppe Biagini

Course coordinator: Olivera Djuric, MD PhD

Course Programme:

Day	Topic	Hours
Monday 31/5/2021	Part I Lecture: Principles of causation: causal inference, directed acyclic graphs, relation between variables (bias, confounding, effect modification)	16:00-18:00
	Group assignment - problem solving	18:00-19:00
Tuesday 01/6/2021	Part I Lecture: Principles of statistical inference Group assignment - statistical vs. clinical inference	16:00-17:15
	Part II Lecture: Sample size and power calculation Practical exercise on calculating power and sample size for experimental study	17:15-18:15
	Part III Lecture: Choice of adequate statistical test Group assignment - problem solving	18:15-19:00
Thursday 03/06/2021	Part I Lecture: Overview of epidemiological study designs	16:00-16:45
	Part II Lecture: Basics of experimental studies	16:45-18:15

	<p>Theoretical exercise on types of experimental studies and types of clinical trials</p> <p>Part III</p> <p>Lecture: Statistical analysis in experimental design</p>	18:15-19:00
Friday 04/6/2021	<p>Part I</p> <p>Lecture: Basics of correlation – use and misuse</p> <p>Part II</p> <p>Lecture: Regression – basic principles</p> <p>Lecture: Linear regression and multiple linear regression</p> <p>Part III</p> <p>Practical exercise in SPSS or STATA</p>	<p>16:00-16:45</p> <p>16:45-18:30</p> <p>18:30-19:00</p>
Monday 07/6/2021	<p>Part I</p> <p>Lecture: Logistic regression – basic concepts</p> <p>Lecture: Single and multiple logistic regression</p> <p>Part II</p> <p>Practical exercises in SPSS or STATA</p>	<p>16:00-17:00</p> <p>17:00-18:15</p> <p>18:15-19:00</p>
Tuesday 08/6/2021	<p>Part I</p> <p>Lecture: Logistic regression – variable selection and model building</p> <p>Lecture: Logistic regression – statistical adjustment – interaction and confounding</p> <p>Lecture: Regression – diagnostics</p> <p>Part II</p> <p>Practical exercises in SPSS or STATA</p>	<p>16:00-18:00</p> <p>18:00-19:00</p>
Thursday 10/6/2021	<p>Part I</p> <p>Lecture: Analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), analysis of covariance (ANCOVA), and multivariate analysis of covariance (MANCOVA)</p> <p>Part II</p> <p>Lecture: Repeated measures analysis</p> <p>Part III</p> <p>Practical exercise in SPSS or STATA</p>	<p>16:00-17:15</p> <p>17:15-18:15</p> <p>18:15-19:00</p>
Friday 11/6/2021	<p>Part I</p> <p>Lecture: Basic concepts of time-to-event data</p> <p>Lecture: Testing for equivalency of time distributions (comparing survival curves)</p>	16:00-18:15

	Lecture: Regression models for time-to-event data (Cox regression) Part II Practical exercise in SPSS or STATA	18:15-19:00
Monday 14/06/2021	Presentation and discussion of a protocol for the experimental study assigned in day one	16:00-19:00
Work in groups	General group assignment: write and present a protocol for a randomized controlled study, emphasis on statistical analysis plan and sample size calculation	≥4h
Theoretical (homework) exercises	<ol style="list-style-type: none"> 1. Regression 2. Time-to-event analysis 	1.5h 1.5h