Course Title	Statistics in Medical Research, Data Analysis and Interpretation
Course Code	PMS710
Course Type	Compulsory
Level	Doctoral (3rd cycle)
Year / Semester	1st year / 1st semester
Teacher's Name	TBA

ECTS	10	Lectures / week	3 hours/14 weeks	Laboratories / week	N/A

Course Purpose and Objectives	The course provides advanced statistical methods and reasoning. Students will understand the concept of sampling variation and its critical role in the construction of confidence intervals and hypothesis testing. The statistical methods will be applied to various datasets, including basic science, clinical, epidemiological, etc, using statistical software (particularly SPSS) and results will be interpreted. Students will be exposed to the appropriate methods to analyse sampe data to derive evidence-based conclusions. Students will be trained in the use of statistical methods in biomedical research by applying some statistical tests and statistical models. Students will be able to describe, interpret and use the findings of research. A primary objective of the course, is to enable students to appropriately select and apply statistical methods to analyse their own dataset and to interpret the findings of their PhD project, as well as ensure their ability to apply statistical methods appropriately in their future research endeavors.
Learning Outcomes	Upon successful completion of this course students should be able to: • Demonstrate expertise regarding the basic concepts of biostatistics and their applications to medical science • Interpret the findings of the most frequently used statistical methods in medical science • Demonstrate ability to critically review the statistical methods and results of basic science studies and clinical trials presented in bulbished articles • Select the appropriate statistical approach for a particular study • Understand and interpret statistical results • Assess the quality of research evidence • Interpret results in both advanced quantitative and qualitative studies. • Apply statistical methods • Select and apply the appropriate statistical test for each research question • Apply statistical tests to actual data

	• Analyze sample data to draw conclusions for the study population • Determine the sample size required in a research study based on the study design, sampling method, research question and hypothesis • Evaluate and analyze data, as well as create tables and diagrams for their presentation. • Identify and interpret correctly the results and findings of the statistical tests • Use simple and advanced statistical methods and evaluate the findings of research studies/strategies. • Use SPSS and other statistical software as tools necessary for medical science research. • Evaluate the statistical methods used in published research studies as well as to interpret the tables and diagrams presented in these studies.

Prerequisites	None	Co-requisites	None

Course Content	Introductory concepts and type of data, • Describing data with frequency tables, describing data with diagrams, Describing data with summary measures of location and variance • Distribution of sample mean • Estimating confidence interval for a population mean • Estimating confidence interval for the difference and the ratio of two population parameters • Statistical test for the difference between population means, the statistical test t for independent means • The one way and two-way ANOVA test, the ANCOVA test and the MANOVA test • Statistical test for the ratio of two population parameters and x2 statistical test for the independence of two categorical variables • Estimating the correlation between two numerical variables • Linear regression • Logistic regression • Survival analysis • Power and sample size calculation in study designs • Intraclass correlation coefficient (ICC), Cronbach's alpha and Exploratory Factor Analysis The theoretical concepts will be specialised in the context of the weekly computer laboratory, where students will process and analyse data by means of a statistical software, so that upon completion of the course

	they will be able to process data, prepare tables and charts and produce statistical results in their own scientific work.
Teaching Methodology	Face-to-face
Bibliography	Plichta, S. and Kelvin E. Munro's Statistical Methods for Health Care Research. 6th Edition. J. B. Lippincoltt Company, 2013 Field A. Discovering Statistics Using IBM SPSS Statistics. 5th Edition, Sage Publishing, 2018 Bowers D. Medical Statistics from Scratch: An Introduction for Health Professionals. 3rd Edition. Wiley-Interscience, 2014
Assessment	

Final Exam	40%
Class Participation and attendance	10%
Assignment 1	25%
Assignment 2	25%%
Total	**100%**

Language	English