

Course Title	Applied Statistics for Epidemiology and Public Health				
Course Code	MPH-512				
Course Type	Required				
Level	2 <sup>nd</sup> Cycle				
Year / Semester	1 / 2				
Teacher's Name	Dr Christiana Demetriou				
ECTS	10	Lectures	15	Interactive learning activities	24
Course Purpose and Objectives	<p>The main objectives of the course are to:</p> <ul style="list-style-type: none"> <li>• Illustrate how the different types of data involved in epidemiological research determine the methods for their statistical analysis.</li> <li>• Articulate the basic principles of probability, random error, statistical significance, study power, Type I and Type II errors.</li> <li>• Introduce students to the STATA statistical software programme and train them on how to load, clean, modify, manage, and analyze data.</li> <li>• Equip students with the analytical and critical thinking skills for performing basic descriptive analysis of numeric and categorical variables.</li> <li>• Equip students with the analytical and critical thinking skills to perform analysis for determining associations with numeric and categorical variables, including statistical adjustment for confounding, as well as identification of interactions and effect mediations.</li> <li>• Equip students with the analytical and critical thinking skills for performing analysis of population impact, as well as survival analysis.</li> </ul>				
Learning Outcomes	<p>After completion of the course students are expected to be able to:</p> <ol style="list-style-type: none"> <li>1. Appraise the different types of variables in epidemiological research and the different frequency distributions including the normal distribution and its statistical qualities.</li> <li>2. Critically apply and interpret random error, statistical significance (p-value and Confidence Intervals), study power, and Type I and II errors.</li> <li>3. Load, clean, modify, and manage data using the Stata statistical software programme.</li> <li>4. Derive and report appropriate descriptive statistics for different research scenarios.</li> <li>5. Use the statistical software package Stata to calculate and interpret appropriate basic summary statistics (mean, median, standard deviation, interquartile range, proportions, risk and rate).</li> <li>6. Critically apply the concept of the dependent and the independent variable to identify appropriate analytic statistics for determining the presence of associations.</li> </ol>				

	<ol style="list-style-type: none"> <li>7. Use the statistical software package Stata to calculate and interpret measures of association for categorical exposures and numeric outcomes (t-test and ANOVA).</li> <li>8. Use the statistical software package Stata to calculate and interpret measures of association for numeric exposures and numeric outcomes (scatterplots and correlation analysis).</li> <li>9. Use the statistical software package Stata to calculate and interpret measures of association for categorical exposures and categorical outcomes (chi-squared test).</li> <li>10. Use the statistical software package Stata to calculate and interpret measures of association using non-parametric statistical tests.</li> <li>11. Use the statistical software package Stata to perform and interpret the results of linear regression analysis for analysing numeric outcomes.</li> <li>12. Use the statistical software package Stata to perform and interpret the results of multiple regression analysis for analysing numeric outcomes.</li> <li>13. Use the statistical software package Stata to perform and interpret the results of logistic univariable and multivariable regression analysis for analysing binary outcomes.</li> <li>14. Use the statistical software package Stata to calculate and interpret measures of population impact using logistic regression analysis.</li> <li>15. Use the statistical software package Stata to determine interactions in linear and logistic regression analysis.</li> <li>16. Use the statistical software package Stata to determine confounding and effect mediations in linear and logistic regression analysis.</li> <li>17. Use the statistical software package Stata to perform and interpret survival (time-to-event) analysis.</li> </ol>		
Prerequisites	None	Required	None
Course Content	<ol style="list-style-type: none"> <li>1. Introduction to measurement: types of variables and types of distributions</li> <li>2. Introduction to statistical analysis for Epidemiology and Public Health</li> <li>3. Introduction to Stata statistical software programme</li> <li>4. Descriptive analysis of numeric data: mean, median, standard deviation, interquartile range, histograms, box –plots</li> <li>5. Descriptive analysis of categorical data: proportions, risk and rate.</li> <li>6. Basic analysis for determining associations with numeric outcomes I: T-test and ANOVA.</li> <li>7. Basic analysis for determining associations with numeric outcomes II: Scatterplots and correlation analysis.</li> <li>8. Basic analysis for determining associations with categorical outcomes: Chi-squared.</li> <li>9. Non-parametric statistical tests</li> <li>10. Linear regression analysis</li> <li>11. Multiple regression analysis</li> <li>12. Univariable and Multivariable Logistic regression analysis</li> </ol>		

	<p>13. Assessing interactions using Linear and Logistic regression analysis</p> <p>14. Assessing confounding and mediation using Linear and Logistic regression analysis</p> <p>15. Survival (time-to-event) analysis</p>																														
Teaching Methodology	This programme is delivered via distance learning (online) and includes recorded lectures, interactive online tutorials (Webinars) and discussion forums, as well as online exercises and other activities.																														
Bibliography	<p><b>Required Textbooks / Reading:</b></p> <table border="1"> <thead> <tr> <th>Title</th> <th>Author(s)</th> <th>Publisher</th> <th>Year</th> <th>ISBN</th> </tr> </thead> <tbody> <tr> <td>An Introduction to Medical Statistics (4<sup>th</sup> ed.)</td> <td>Bland M.</td> <td>Oxford Medical Publications</td> <td>2015</td> <td>9780199589920, 9780191002991, 9780192518392.</td> </tr> <tr> <td>Oxford Handbook of Medical Statistics (2nd ed.)</td> <td>Peacock &amp; Peacock</td> <td>Oxford University Press</td> <td>2020</td> <td>9780191803208</td> </tr> </tbody> </table> <p><b>Recommended Textbooks / Reading:</b></p> <table border="1"> <thead> <tr> <th>Title</th> <th>Author(s)</th> <th>Publisher</th> <th>Year</th> <th>ISBN</th> </tr> </thead> <tbody> <tr> <td>Essential Medical Statistics (2nd ed.)</td> <td>Kirkwood B. Sterne J.</td> <td>Blackwell Scientific</td> <td>2003</td> <td>0865428719</td> </tr> <tr> <td>Statistical Models in Epidemiology.</td> <td>Clayton D, Hills M.</td> <td>Oxford University Press</td> <td>1993</td> <td>019852221-5</td> </tr> </tbody> </table>	Title	Author(s)	Publisher	Year	ISBN	An Introduction to Medical Statistics (4 <sup>th</sup> ed.)	Bland M.	Oxford Medical Publications	2015	9780199589920, 9780191002991, 9780192518392.	Oxford Handbook of Medical Statistics (2nd ed.)	Peacock & Peacock	Oxford University Press	2020	9780191803208	Title	Author(s)	Publisher	Year	ISBN	Essential Medical Statistics (2nd ed.)	Kirkwood B. Sterne J.	Blackwell Scientific	2003	0865428719	Statistical Models in Epidemiology.	Clayton D, Hills M.	Oxford University Press	1993	019852221-5
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Assessment	<p>Online quiz (formative)</p> <p>Coursework (1 data analysis assignment) – 30%</p> <p>Mandatory interactive activities and webinar attendance/participation – 10%</p> <p>Final exam – 60%</p>																														
Language	English																														