Course Title	Applied Statistics for Epidemiology and Public Health				
Course Code	MPH-512				
Course Type	Required				
Level	2nd Cycle				
Year / Semester	1 / 2				
Teacher's Name	Dr Constantinos Koshiaris				
ECTS	10	Lectures	11	Interactive learning activities	24
Course Purpose and Objectives	The main objectives of the course are to: ● Cover and explain the different types of data involved in epidemiological research and highlight the importance of their differences. ● Cover and explain the basic principles of probability, random error, statistical significance, study power, Type I and Type II errors. ● Introduce students to the STATA statistical software programme and train them on how to load, clean, modify, manage, and analyze data. ● Equip students with the analytical and critical thinking skills for performing basic descriptive analysis of numeric and categorical variables. ● 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. ● Equip students with the analytical and critical thinking skills for performing analysis of population impact, as well as survival analysis.				
Learning Outcomes	After completion of the course students are expected to be able to: 1. Outline and examine the different types of variables in epidemiological research. 2. Outline and examine the different frequency distributions and describe the normal distribution and its statistical qualities. 3. Describe, apply, and interpret random error, statistical significance (p-value and Confidence Intervals), study power, and Type I and II errors. 4. Load, clean, modify, and manage data using the Stata statistical software programme. 5. Describe and apply different descriptive statistics for different research scenarios. 6. Use the statistical software package Stata to calculate basic summary statistics, such as mean, median, standard deviation, interquartile range, proportions. 7. Use the statistical software package Stata to calculate basic summary statistics, such as proportions, risk, and rate. 8. Describe and apply different analytic statistics for different research scenarios. 9. Describe the concept of the dependent and the independent variable and how these are used for determining the presence of associations.				

	10. Use Stata to calculate measures of association for categorical exposures and numeric outcomes (t-test and ANOVA). 11. Use the statistical software package Stata to calculate measures of association for numeric exposures and numeric outcomes (scatterplots and correlation analysis). 12. Use the statistical software package Stata to calculate measures of association for categorical exposures and categorical outcomes (chi-squared test). 13. Use the statistical software package Stata to calculate measures of association using non-parametric statistical tests. 14. Use the statistical software package Stata to perform linear regression analysis for analysing numeric outcomes. 15. Use the statistical software package Stata to perform multiple regression analysis for analysing numeric outcomes. 16. Use the statistical software package Stata to perform logistic univariable and multivariable regression analysis for analysing binary outcomes. 17. Use the statistical software package Stata to calculate measures of population impact using logistic regression analysis. 18. Use the statistical software package Stata to determine interactions in linear and logistic regression analysis. 19. Use the statistical software package Stata to determine confounding and effect mediations in linear and logistic regression analysis. 20. Use the statistical software package Stata to perform survival (time-to-event) analysis.		
Prerequisites	None	Required	None
Course Content	1. Introduction to measurement: types of variables and types of distributions 2. Introduction to statistical analysis for Epidemiology and Public Health 3. Introduction to Stata statistical software programme 4. Descriptive analysis of numeric data: mean, median, standard deviation, interquartile range, histograms, box –plots 5. Descriptive analysis of categorical data: proportions, risk and rate. 6. Basic analysis for determining associations with numeric outcomes I: T-test and ANOVA. 7. Basic analysis for determining associations with numeric outcomes II: Scatterplots and correlation analysis. 8. Basic analysis for determining associations with categorical outcomes: Chi-squared. 9. Non-parametric statistical tests 10. Linear regression analysis 11. Multiple regression analysis 12. Univariable and Multivariable Logistic regression analysis 13. Assessing interactions using Linear and Logistic regression analysis 14. Assessing confounding and mediation using Linear and Logistic regression analysis 15. Survival (time-to-event) analysis		

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<tr><td>Teaching Methodology</td><td>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.</td></tr>
<tr><td>Bibliography</td><td>Required Textbooks / Reading:
<table>
<tr><th>Title</th><th>Author(s)</th><th>Publisher</th><th>Year</th><th>ISBN</th></tr>
<tr><td>An Introduction to Medical Statistics (4th ed.)</td><td>Bland M.</td><td>Oxford Medical Publications</td><td>2015</td><td>9780199589920, 9780199100299 1, 9780192518392.</td></tr>
<tr><td>Oxford Handbook of Medical Statistics (2nd ed.)</td><td>Peacock & Peacock</td><td>Oxford University Press</td><td>2020</td><td>9780191803208</td></tr>
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Recommended Textbooks / Reading:
<table>
<tr><th>Title</th><th>Author(s)</th><th>Publisher</th><th>Year</th><th>ISBN</th></tr>
<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>
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<tr><td>Assessment</td><td>Online quiz (formative)
Coursework (1 data analysis assignment) – 30%
Mandatory interactive activities and webinar attendance/participation – 10%
Final exam – 60%</td></tr>
<tr><td>Language</td><td>English</td></tr>
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