EPIDEMIOLOGY OF TRANSMISSIBLE DISEASES – Faculty of Sciences

Objectives:
Students should understand the basic definitions and principles of epidemiology. Students will know how to design epidemiological studies. In particular, they will become familiar with crosssectional studies, case-control, cohort studies, and clinical trials. For each type of design, students will know how to measure and evaluate association between disease and risk factors, and will understand the assets and liabilities of each type of experimental design. Students will become familiar with the concepts, definitions, and methods which are specific to infectious diseases. Students will know the basics of building mathematical and/or computational models aimed at simulating the population dynamics of infectious diseases. Understand the patterns of infectious disease dynamics and what to expect from control measures, namely mass vaccination.

Program:
Incidence, prevalence, mortality, rates, confounding.
Relative risk, odds ratio. Etiological risk.
Case-control studies.
Cohort studies: design and analysis. People-time. Instantaneous rate of incidence.
Clinical trials. Ethical considerations. The protocol. Phase I to IV. Controls, blindness, randomization. Parallel and
cross-over trials.
Clinical epidemiology. The validity of diagnostic tests. Sensitivity and specificity. Predictive value and implications
for the clinical practice. Diagnostic tests with continuous variables.
Infectious diseases (IDs) and etiological agents. Natural history of the infection in the host. The concept of R0. Herd
immunity.
Building mathematical models for IDs: difference equations.
The parameters of mathematical models of IDs and their estimation.
Models for IDs framed in differential equations.
Patterns of population dynamics of IDs.
Vaccination: history. Main effects of vaccination upon the population dynamics of IDs.

Evaluation methodology
Theoretical lectures (T) followed problem-solving sessions (TP) where epidemiological problems are solved both conceptually and numerically. The TP sessions are focused on the materials lectured in the T sessions and their timing is tuned with them.
The recommended evaluation of students in this course combines a battery of weekly quizzes (40% of the final mark), handed out at the beginning of TP sessions, with a final exam (60% of the final mark). The weekly quizzes are discussed in class, immediately after they are forwarded by the students, thus contributing to their problem-solving skills.

Recommended bibliography:
Rothman, K. 2002. Epidemiology: An Introduction. Oxford Univ Press
Woodward, M. 2004. 2nd ed. Epidemiology. Study Design and Data Analysis. Chapman & Hall.

Vynnycky, E and R White. 2010. An Introduction to Infectious Disease Modelling. Oxford Univ Press.

Materials that can be downloaded from these sites:
1st part - General epidemiology:
http://webpages.fc.ul.pt/~mcgomes/aulas/Epidemiologia%20LCS/index.html
2nd part - Infectious diseases:
http://webpages.fc.ul.pt/~mcgomes/aulas/ddi/index.html