Title:	Mathematical Epidemiology of Infectious Diseases
Type of educational activity/teaching format:	Online course
Responsible and offering lecturer:	Diekmann Odo, Emeritus professor, University of Utrecht
Other lecturers if involved:	Almeida Luis (DR CNRS, Sorbonne université)
Start date - end date and duration:	10 times 2 hours. Start January 17th , 10 am. Zoom link: https://us02web.zoom.us/j/81220619187?pwd=LzBRc21TZk5ub081Yzd6L3RtL1ZYUT09
Short description of the content of the course:	**Topics** : The course will concentrate on the formulation of mathematical models of the spread of an infectious disease in a host population; the analysis of such models; the derivation of epidemiological insights by interpretation of the results of the analysis. The course focusses on deterministic population level models, but with due attention for the underlying stochastic processes at the individual level. From a mathematical point of view, the emphasis is on Renewal Equations, a certain kind of delay equations. There will be some, but not much, attention for data analysis and control efforts. A preliminary list of topics is Epidemic outbreak in a demographically closed population (or: what is the celebrated 1927 paper of Kermack & McKendrick all about ? Not (just) about the SIR and SEIR compartmental models !)

	Heterogeneity : the next-generation matrix/operator, the basic reproduction number (Perron- Frobenius, Krein-Rutman), the Malthusian parameter and the final size equation Compartmental models Including demographic turnover : age structure Spatial Spread Waning Immunity Dangerous Connections: on binding sites models **Literature** : O. Diekmann, J.A.P. Heesterbeek, T. Britton, Mathematical Tools for Understanding Infectious Disease Dynamics, Princeton University Press, 2013
Workload / Credits:	12 ECTS. Each course requires around 2 to 4 hours of homework.
Target group-level:	2nd year MA, PhD students
Language of instruction:	
Learning content:	Introduction to research in the area of the course

Learning objectives:	The course will present the main tools used in the area of research covered by the course and end up at the level of present of knowledge, thus opening directly to research topics.
Assessment methods and criteria:	Online interview
4EU+ Flagship:	Flagship 3: Transforming science and society by advancing information, computation and communication
4EU+ Transversal skills/shared competencies:	The field of mathematical biology is developing fast in several 4EU+ universities and this course can serve as a common base of knowledge. Mathematical epidemiology is nowaday of societal importance. What is really the R0? This course will explain it is not as easy as one can think.