課程名稱: 流行病學的數理模型

Mathematical Models in Epidemiology

課號/班別: MAC9040

上課時間 (Time): Tuesday 9:10-12:0 學分: 3

授課教師: 陳建隆 (Jann-Long Chern)

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本課程的主題與目標:

此課程裡，我預計利用相關數學模型來對流行病的傳播作一個數學探討與學習。我們同時也嘗試學習去利用數學模型來對包含受矚目的 HIV/AIDS 與 COVID-19 等病毒傳播數據作一數值模擬的預測。

課程裡會運用到微積分與矩陣計算的一些基本知識。非常歡迎同學們來一起修課學習。此課程也會建立一個學習上的 Line 群組，來促進與方便修課同學們與我大家共同對流行病相關數理主題的討論。

下述是此課程的大綱：

This course would like to attract who are interested in mathematical models and its applications to various mathematical models of infectious diseases. The mathematical models provide approaches to study how mathematical concepts could help us in investigating the spread of infectious pathogens (e.g., viruses, bacteria) through dynamic populations. There are three main objectives:

(1) Basic principles of mathematical models in infectious disease epidemiology

(2) Mathematics and methods required as studying these mathematical models in epidemiology.

(3) Applying mathematical models to existing data as little projects/experiments (e.g., math. models vs. growth of Covid-19 infectious population).

Week 1-6 (including mid-termone exam): Basic Concepts of Mathematical Epidemiology

1 Introductionto Mathematical Epidemiology

2 Simple Compartmental Models for Disease Transmission

3 Endemic Disease Models

4 Epidemic Models

5 Models with Heterogeneous Mixing

6 Models for Diseases Transmitted by Vectors

Week 7-12 (including mid-termone exam): Models for Specific Diseases

7 Modelsfor Tuberculosis. 8 Models for HIV/AIDS

9 Modelsfor Influenza 10 Models for Ebola.

11 Models for Malaria 12 Dengue Fever and the ZikaVirus

13 Project Studies(in Working Groups)

參考書(References):

(1) Brauer, Fred; Castillo-Chavez,Carlos; Feng, Zhilan Mathematical models in epidemiology. Texts in AppliedMathematics, 69. *Springer, New York,* 2019. xvii+619 pp.
(2) J. D. Murray, Mathematical Biology Vol I-II.
(3) Related Notes.

評量配分比重: Exercises and homes works + Special Reports + Exam

Office Hours: Wednesday 12-14, M204,

or Make point with Teacher

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