

Every Friday, 9:00–12:00,
from **October 3 to December 12, 2025**
Lecture Room B, 4th Floor, The 3rd General Building, NTHU

Every Friday, 9:00–12:00,
from **December 19, 2025, to January 16, 2026**
Room 505, Cosmology Building, NTU

An Introduction to Mathematical Epidemiology

Prerequisites

Dynamical Systems;
Probability Theory

Online Meeting
Please contact Murphy

murphyyu@ncts.tw
if you need to
participate online.

Registration**Speaker**

Xueying Wang
Washington State University

Organizers

Feng-Bin Wang
Chang Gung University

Chang-Hong Wu
National Yang Ming
Chiao Tung University

Chang-Yuan Cheng
National Kaohsiung
Normal University

Introduction & Purposes

The proposed course is a 4-month topics course on An Introduction to Mathematical Epidemiology during my visit to NCTS. This course is specifically designed to lay a solid theoretical foundation in infectious disease modeling, with a focus on dynamical systems, bifurcation theory, stochastic processes, and networks. The course is intended for graduate students, senior undergraduates, and researchers interested in the mathematical underpinnings of infectious disease dynamics. Students will gain a comprehensive understanding of the mathematical tools necessary to model disease spread and analyze real-world epidemic data.

Outline & Descriptions

This course offers weekly 3-hour lectures combining theoretical foundations and practical tools in mathematical epidemiology.

Part I (Tsing Hua University) covers:

- Classical epidemic models (SIR, SEIR) and dynamical systems
- Bifurcation theory and critical transitions in disease dynamics
- Stochastic modeling (Markov chains, SDEs)
- Network-based modeling of disease spread

Part II (NCTS, NTU) focuses on:

- Case studies and data-driven model calibration (e.g., COVID-19, cholera, Zika)
- Interdisciplinary applications and public health strategy design