Course Title	
II(Topics in Mathematical Science II)	

Department/Program	Grade

Class style	Compulsory or Elective

Registration code	Semester,Day & Period
1610019	1

Credit	Course type
2	

Instructor	(Richard Serge)
Laboratory	Graduate School of Mathematics
Contact	richard@math.nagoya-u.ac.jp
Room	Sci. Bldg A, 247

Course purpose
Title : Graphs and epidemiology

The motivation for studying and teaching this subject has been triggered by the pandemic which started in 2020. Graphs, and in particular random graphs, are used for studying the propagation of epidemics on them. During this course, we shall study the necessary notions for understanding the current researches on this hot topic. |

Prerequisite
Knowledge on standard undergraduate linear algebra, calculus and advanced calculus.

Grading
Grades based on attendance and on written reports. An active participation of the students is expected.

F	W	Criteria for "Absent(W)" &"Fail" grades

Related courses
Any course on graph theory or on probability. This course will complement such courses, but they are not considered as prerequisite.

About attend other
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This course is open for any students at Nagoya University. Motivated undergraduate students are also welcome.

Class room

Mathematics Building, room 309, or on Zoom.

Level
2

Keyword
Graphs, random graphs, mean field theory, SIS and SIR models, various extensions.

Advice
It is certainly easier to attend a course in English and to discuss in this language in a quiet university environment rather than later in a busy life.

Goal
Understand the basic notions of epidemics on graphs.

Content
Tentative program: Basic definitions for graphs Random graphs Ergodic systems on networks with examples Bottom-up + closure Mean-field SIR and percolation Dynamic networks Non-Markovian dynamics, limitations and examples Additional specific topics depending on the interest of the audience

Textbook
Lecture notes will be provided for this course.

Recommended reading
Free reference books will be provided during the lectures, but first part of the course is mainly based on J.L. Gross, J. Yellen, M. Anderson, Graph theory and its applications, CRC press, 2019. M. Newman, Networks, second edition, Oxford University Press, 2018. I. Kiss, J. Miller, P. Simon, Mathematics of epidemics on networks, Springer, 2017. More material will be available on http://www.math.nagoya-u.ac.jp/~richard/Graphs.html

Contact method
By email.

Remarks
Additional information and material will be added regularly on http://www.math.nagoya-u.ac.jp/~richard/Graphs.html