SISR 617 (4866) Principles in Systems Pharmacology

(Code: 4866, 1st~2nd year, 4 units)

(Course ID: GS－c4866－S)

1. Instructors

Name	Position	Department	Contact Information
Chief Instructor: Somponnat Sampattavanich	Lecturer	Department of Pharmacology	Somponnat.sam@mahidol.ac.th

2. Classroom/Lab Lecture

Lecture

Lecture Room 1119, Department of Pharmacology

3. Course Purpose and Outline

Systems-level reasoning of complex biological processes; advanced omics techniques for systems pharmacology research; Basics in handling big data from omics measurement; Computational concepts in biomolecular dynamics, signaling cascades, feedback regulations and biological noises.

4. Course objectives

By the end of the course, participants will be able to understand princiciples of systems pharmacology and research, ranging from data gathering to computational biology.

5. Format

Lectures, group discussion, report presentation

All programs will be conducted in English.

All class activities will be provided in an online format via Moodle platform

6. Course Details

No.	Date	Time	Topic	Lecturer
Module I: Quantitative foundations for systems pharmacology			
1	TBD	09.00-12.00	What is systems approach + MATLAB tutorial	Somponnat
2	TBD	09.00-12.00	Mathematical representation of biological systems	Somponnat
3	TBD	09.00-12.00	Rate law and basic biomolecular dynamics	Somponnat
			Module II: Mechanistic approach	
4	TBD	09.00-12.00	Mechaelis Menten kinetics, avidity and cooperativity	Somponnat
5	TBD	09.00-12.00	Solving dynamic models: ode solvers	Somponnat
6	TBD	09.00-12.00	Stability and noise in biology	Somponnat
7	TBD	09.00-12.00	Important network motifs and synthetic biology	Pakpoom(Naresuan)
		09.00-12.00	Exam SIPM508 (I): 1 - 7	Faculty
			Module III: Data-driven approach	
8	TBD	09.00-12.00	Graph Theory basics	Metha
9	TBD	09.00-12.00	Surveying complex biological systems	Siwanon
10	TBD	09.00–12.00	Important databases and basics of data mining	Sira(CU)
11	TBD	09.00-12.00	Building regression models	Metha

			Module IV: Applications in Pharmacology	
12	TBD	09.00-12.00	PK/PD modeling	Dr.Paul
13	TBD	09.00-12.00	Cancer drug discovery	Siwanon
14	TBD	09.00-12.00	Precision Medicine	Manop
15	TBD	09.00-12.00	Student Projects	Faculty
		09.00-12.00	Exam SIPM508 (II): 8 - 14	Faculty

7. Assessment

Scoring

Exam 50%

Student Project 40%j

Attendance 10%

Grade

A   more than 80

B+ between 75-79

B   between 70-74

Criterion-reference grading

A   = 80 points or more

B+   = 70 - 79.99 points

B   = 60 - 69.99 points

C   = 50 - 59.99 points

D   = 40 - 49.99 points

F   = 0 - 39.99 points

8. Prerequisite Reading

When reading materials are given or specified in advance, participants are expected to study those materials before attending the class.

9. Reference Materials

To be announced before individual classes

10. Language used

All classes are conducted in English.

11. Office Hours

Mon – Fri: 9:00 AM – 17:00 PM
Contact: Lecturer Somponnat Sampattavanich, Department of Pharmacology
Email : Somponnat@gmail.com
Please contact the instructor regarding questions or consultations.

12. Note(s) to Students

None.