Course Syllabus

SIPS 530

Academic Year 2025

Department of Physiology

Faculty of Medicine Siriraj Hospital, Mahidol University

Course ID and name:	SIPS 530: Fundamentals of Medical Physiology
Course coordinator:	Assoc. Prof. Narawut Pakaprot, MD, PhD
Instructors:	Assoc. Prof. Narawut Pakaprot, MD, PhD
	Assoc. Prof. Wattana Watanapa, MD, PhD
	Assoc. Prof. Suwattanee Kooptiwut, MD, PhD
	Assist. Prof. Sompol Tapechum, MD, PhD
	Assist. Prof. Yodying Dangprapai, MD, PhD
	Instructor Rujapope Sutiwisesak, MD, PhD
Credits:	1 (1-0-2) (lecture – laboratory – self-study)
Curriculum:	Masters of Science Program in Medical Physiology
Course type:	☐ Core ☑ Required ☐ Electives
Semester offering:	02/2025
Prerequisite:	None
Date of Latest Revision:	12/01/2026

Course Description:

Homeostasis; body systems; biophysical principles, resistance-capacitance circuit, time constant, exponential decay; membrane transport; intercellular communication, electrical signaling in excitable cells, resting membrane potential, action potential, neural signal propagation; hormonal receptors, intracellular signal transduction; instrumentation for physiological signal recordings

Course-level Learning Outcomes (CLOs)

Upon completion of this course, students are able to:

1. Integrate fundamental physiological principles to explain the mechanisms of biological systems.
2. Perform physiological signal recordings with proper equipment setup.
3. Discuss physiological insights collaboratively to solve complex biological problems.

Constructive Alignment of CLOs and Program's ELOs

CLOs	ELO1	ELO2	ELO3	ELO4
1. Integrate fundamental physiological principles to explain the mechanisms of biological systems	I			R
2. Perform physiological signal recordings with proper equipment setup	I	I	I	R
3. Discuss physiological insights collaboratively to solve complex biological problems		I		R

Remarks: Show the level of the course management with the symbols I, R, P, and M.

Program's Expected Learning Outcomes

1. Demonstrate the current medical physiological knowledge for common clinical application.
2. Evaluate the scientific research and major research developments.
3. Perform medical physiology research with a technique in an ethical way to test an idea or hypothesis in an area of interest.
4. Communicate knowledge and ideas of medical physiological research clearly to peers and the scientific community at national level

Course Schedule and teaching/assessment plan

No.	Topic	Date/Time	Hours			CLOs	Teaching & learning strategy	Assessment (in-class)	Lecturers
			Lecture	Laboratory	Self Study				
1	Orientation	Mon 12/1/2569: 18.00-18.30	0.5	-	-	-	asynchronous lecture	-	Dr.Narawut
2	Homeostasis and body systems	Mon 12/1/2569: 19.00-20.00	1		2	1	asynchronous lecture	Post-learning exercise	Dr.Wattana
3	Time constant and exponential decay	Wed 14/1/2569: 18.00-20.00	2	-	4	1	asynchronous lecture	Post-learning exercise	Dr.Wattana
4	Resistance-capacitance circuit	Fri 16/1/2569: 18.00-19.00	1	-	2	1	asynchronous lecture	Post-learning exercise	Dr.Sompol
5	Membrane transport	Sat 17/1/2569: 14.00-16.00	2	-	4	1,3	Onsite lecture	Q&A	Dr.Yodying
6	Electrical signaling in excitable cells and resting membrane potential	Mon 19/1/2569: 18.00-20.00	2	-	4	1	asynchronous lecture	Post-learning exercise	Dr.Narawut
7	Biophysical principles exercise	Wed 21/1/2569: 18.00-20.00 Zoom ID: 947 9559 4822 Passcode: sips530	2	-	4	3	Online synchronous lecture	Rubric	Dr.Wattana
8	Action potential and neural signal propagation	Fri 23/1/2569: 18.00-19.00	1	-	2	1	asynchronous lecture	Post-learning exercise	Dr.Narawut
9	Hormone receptors	Mon 26/1/2569: 18.00-19.00	1	-	2	1	Online	Q&A	Dr.Suwattanee

		Zoom ID: 947 9559 4822 Passcode: sips530					synchronous lecture		
10	Intracellular signal transduction	Tue 27/1/2569: 18.00-19.00 Zoom ID: 947 9559 4822 Passcode: sips530	1	-	2	1	Online synchronous lecture	Q&A	Dr.Suwattanee
11	Q & A	Wed 28/1/2569: 18.00-19.00 Zoom ID: 947 9559 4822 Passcode: sips530	-	-	`4	1,3	Online synchronous lecture	Rubric	Dr.Wattana, Dr.Sompol, Dr.Yodying, Dr.Narawut, Dr.Suwattanee
12	Group discussion (Intracellular signal transduction)	Thu 29/1/2569: 18.00-19.00 Zoom ID: 947 9559 4822 Passcode: sips530	1		2	1,3	Online synchronous lecture	Rubric	Dr.Suwattanee
13	Instrumentation for physiological recordings	Sat 14/2/2569: 9.00-11.00	-	3	1.5	2,3	Practice (onsite lab)	Rubric	Dr.Rujapope
14	Exam	Sat 14/2/2569: 13.00-15.45					Onsite exam		
15	Feedback	Thu 19/3/2569: 18.00-19.00 Zoom ID: 947 9559 4822 Passcode: sips530	-	-	-		Online synchronous	-	Dr.Wattana, Dr.Sompol, Dr.Yodying, Dr.Narawut, Dr.Suwattanee
Total hours of the study			**13.5**	**3**	**31.5**				

Course Assignments

Assignment materials; reading, VDO

Assessment Criteria

- Assess the score of the test at the end of the class
- Attend the assigned activities not less than 80%

70%	Summative examination
15%	Performance in discussion classes
15%	Laboratory performance

Rubric for Laboratory performance

On the rating scale 0 to 3 when 0 = no satisfied, 1 = partially satisfied, 2 = satisfied, and 3 = very satisfied, please rate the students

1) Explain the objectives of experimental technique used in the lab

☐ 0 ☐ 1 ☐ 2 ☐ 3

2) Explain the procedures of experimental technique used in the lab

☐ 0 ☐ 1 ☐ 2 ☐ 3

3) Punctuality

☐ 0 ☐ 1 ☐ 2 ☐ 3

4) Responsibility in doing the assigned tasks

☐ 0 ☐ 1 ☐ 2 ☐ 3

Rubric for performance in discussion classes

	4	3	2	1	0
How well does the student participate in class by presenting data/asking questions/offering ideas? (Frequency of contributions)	Frequently and voluntarily (*Does not prevent others from answering)	Voluntarily	Responses only after being questioned or named	Rarely, reluctantly	Never

How good is the quality of student's contributions? (Quality of contributions)	Demonstrates comprehensive knowledge and critical thinking skills	Mostly relevant, reflecting understanding of knowledge	Somewhat relevant, reflecting some levels of understanding of knowledge	Not relevant, reflecting insufficient understanding of knowledge	Lacks understanding of knowledge or infrequent contributions
How well does the student behave during presentation? (Behavior in class)	Actively and respectfully pays attention to peers/instructor; full engagement throughout the class	Pays attention to peers/instructor; engages most of the time in class	Listens to peers/instructor	Sometimes does not listens to peers/instructor; sometimes displays inappropriate behavior	Fails to pay attention; displays inappropriate behavior in class

GRADING CRITERIA

A	80%	to	100%, with all CLOs passed (minimum 50% each)
B+	65%	to	<80%, with all CLOs passed (minimum 50% each)
B	50	to	<65%, with all CLOs passed (minimum 50% each)
F	<50%		

Actions Based on CLO Status:

I-1	Retake the exam and/or complete the assigned work within one month after the exam result is announced, if at least one CLO (CLO1-3) is failed
I-2	Complete the assigned work and undergo a new evaluation within the next semester if all CLOs all failed.
I-3	Repeat the course when it is next offered, if all CLOs are failed.

Appeal Procedure

Students are able to inquire about their scores or grade directly to the course coordinator either by direct contact, telephone or email within 1 week after the scores or grade is announced. The appealing though the program is also available.