

Course Syllabus
SIPS 533
Academic Year 2026
Department of Physiology
Faculty of Medicine Siriraj Hospital, Mahidol University

Course ID and name:	SIPS 533 MEDICAL CARDIOVASCULAR PHYSIOLOGY
Course coordinator:	Assoc. Prof. Panapat Uawithya, M.D., Ph.D.
Instructors:	Assoc. Prof. Panapat Uawithya, M.D., Ph.D. Assoc. Prof. Wattana Watanapa, M.D., Ph.D. Lect. Luecha Boontaveekul, M.D., M.Sc., Dip. in Thai Board of Family Medicine Lect. Thanus Teeratitayang-gool, M.D. Dip. in Anesthesia
Credits:	1 (1-0-2) (lecture – laboratory – self-study)
Curriculum:	Master of Science Program in Medical Physiology
Course type:	☐ Core ☒ Required ☐ Electives
Semester offering:	1/2026
Prerequisite:	None
Date of Latest Revision:	11/08/2026

Course Description:

Circulation, cardiac cycle, electrical properties of the heart, electrocardiography, mechanical properties of the heart, control of cardiac output; hemodynamics, vascular physiology, endothelial cell physiology, cardiovascular regulatory mechanisms, alterations in venous return, and physical examination of the cardiovascular system.

Course-level Learning Outcomes (CLOs)

1. Describe key concepts in cardiovascular physiology, including circulation, cardiac cycle, electrical and mechanical properties of the heart, vascular and endothelial physiology, and cardiovascular regulation
2. Apply fundamental cardiovascular physiology to explain normal findings and common circulatory alterations
3. Interpret commonly used cardiovascular parameters, including electrocardiograms (ECG), blood pressure measurements, arterial- pulse.
4. Communicate basic cardiovascular concepts and physiological reasoning clearly in oral and written forms appropriate for peers and small groups

Constructive Alignment of CLOs and Program's ELOs

CLOs	ELO1	ELO2	ELO3	ELO4
1. Describe key concepts in cardiovascular physiology, including circulation, cardiac cycle, electrical and mechanical properties of the heart, vascular and endothelial physiology, and cardiovascular regulation.	I			
2. Apply fundamental cardiovascular physiology to explain normal findings and common circulatory alterations. m	R			
3. Interpret commonly used cardiovascular parameters, including electrocardiograms (ECG), blood pressure measurements, arterial- pulse.		R	R	
4. Communicate basic cardiovascular concepts and physiological reasoning clearly in oral and written forms appropriate for peers and small groups.				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 applications.
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.	MAP-C ปี 2 Date - Time	Topic	Hours			CLOs	Teaching & learning strategy	Reading from Provided Textbook (Pg)	Assessment (in-class)	Lecturers
			Lecture	Laboratory	Self Study					
1	Monday, August 31, 2026 6:00 – 6:30pm	Orientation	0.5	-	1		Synchronous lecture			Dr.Panapat
2	Monday, August 31, 2026 6:30 – 7:30pm	Circulation	1	-	2	1	Asynchronous lecture	p.1-16	Post-learning exercise	Dr.Luecha
3	Wednesday, September 2, 2026 6:00 – 7:00pm	Cardiac cycle	1	-	2	1, 2	Asynchronous lecture	P131-136	Post-learning exercise	Dr.Thanus
4	Wednesday, September 2, 2026 7:00 – 8:00pm	Electrical properties of the heart	1	-	2	1, 2	Asynchronous lecture	p. 51-71	Post-learning exercise	Dr.Wattana
5	Friday, September 4, 2026 6:00 – 8:00pm	Mechanical properties of the heart	2	-	4	1, 2	Asynchronous lecture	p. 121-130, 138-160	Post-learning exercise	Dr.Wattana
6	Monday, September 7, 2026 6:00 – 7:00pm	Electrocardiography	1	-	2	1, 2, 3	Asynchronous lecture	p. 77-106	Post-learning exercise	Dr.Panapat

7	Monday, September 7, 2026 7:00 – 8:00pm	Cardiac regulation	1	-	2	1, 2	Asynchronous lecture	p. 160-178, 297-302	Post-learning exercise	Dr.Wattana
8	Wednesday, September 9, 2026 6:00 – 7:00pm	Hemodynamics	1	-	2	1, 2	Asynchronous lecture	p.13-42	Post-learning exercise	Dr.Luecha
9	Wednesday, September 9, 2026 7:00 – 8:00pm	The vessels	1	-	2	1, 2	Asynchronous lecture	p.189-209, 213-221, 246- 263	Post-learning exercise	Dr.Luecha
10	Friday, September 11, 2026 6:00 – 7:00pm	Endothelial function	1	-	2	1, 2	Asynchronous lecture	p.231-241, 266-285	Post-learning exercise	Dr.Luecha
11	Friday, September 11, 2026 7:00 – 8:00pm	Cardiovascular regulatory mechanisms	1	-	2	1, 2	Asynchronous lecture	p. 355-391	Post-learning exercise	Dr.Wattana
12	Monday, September 14, 2026 6:00 – 7:00pm	Q&A I					Synchronous lecture			Faculty
13	Monday, September 14, 2026 7:00 – 8:00pm	Pulse, blood pressure and the precordium	1	-	2	1, 2, 3	Asynchronous lecture		Post-learning exercise	Dr.Luecha
14	Wednesday, September 16, 2026 6:00 – 7:00pm	Cardiovascular monitoring	1	-	2	1, 2, 3	Asynchronous lecture	P170-178		Dr.Thanus
15	Friday, September 18, 2026 6:00 – 7:00pm	Factors maintaining BP	1	-	2	1, 2, 3, 4	KSA Synchronous lecture		Rubric discussion	Dr.Panapat

16	Monday, September 21, 2026 6:00 – 7:00pm	Response to Alterations in Venous Return	1	-	2	1, 2, 3, 4	KSA Synchronous lecture		Rubric discussion	Dr.Luecha
17	Wednesday, September 23, 2026 6:00 – 7:00pm	Q&A II					Synchronous lecture			Faculty
18	Saturday, September 26, 2026 1:00 – 3:00pm	Summative examination (assay 3 hours 1 days)					Onsite exam			
19	Thursday, October 22, 2026 6:00 – 7:00pm	Reflection and Feedback					Synchronous lecture			Dr.Panapat
			15.5	-	31					

Course Assignments

1. Students are expected to complete assigned readings and participate in discussions. Assignments may include KSA exercise and laboratory reports.

Assessment Criteria

CLOs	Assessment	Proportion (%)
1, 2, 3, 4	Rubric assessment	50
1, 2, 3	Examination	40
4	Attendance	10

2. Students must attend and participate in at least 80% of all activities to pass the course. A minimum score of 50% is required. Grades will be awarded as A, B+, B, or F
GRADE SCALE

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 results are 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 are failed.

I-3 Repeat the course when it is next offered, if all CLOs are failed.

3. Rubric-based assessment of performance and participation in practical sessions
4. Written examination evaluated using a letter grading system

Appeal Procedure

1. An appeal can be made by a student to the course coordinator or the graduate program director.

Course Materials

Required Textbook:

1. Rhoades & Bell. Medical Physiology, 4th Edition. Lippincott Williams & Wilkins
2. Boron & Boulpaep. Medical Physiology, 3rd Edition. Elsevier.
3. Additional readings or handouts will be provided throughout the course.

Class Participation and Discussion Rubric (Revised 2026)

Scoring Scale: 5 = Excellent | 4 = Good | 3 = Satisfactory | 2 = Developing | 1 = Unacceptable

	5	4	3	2	1
1. Ideation & Engagement <i>Measurable Action:</i> Volunteering & initiating	Initiates scientific ideas or perspectives voluntarily and frequently.	Offers relevant ideas or insights voluntarily when prompted.	Contributes answers or ideas only when directly called upon.	Rarely contributes; remains passive during group work.	Fails to contribute any ideas or refuses to answer.
2. Scientific Quality <i>Measurable Action:</i> Analyzing & backing with data	Analyzes cases deeply and justifies views with empirical data.	Explains relevant mechanisms accurately and correctly.	States basic facts from memory without mechanical depth.	Provides irrelevant info that deviates from the clinical topic.	Shows no scientific substance or pre-class preparation.
3. Professionalism & Collaborative spirit <i>Measurable Action:</i> Responding & building on ideas	Actively and respectfully pays attention and builds on peers/instructor's ideas to move discussion forward.	Pays attention and responds to peers/instructor appropriately and politely.	Listens but occasionally loses focus or interrupts others.	Disengages from the group (e.g., uses mobile devices).	Fails to pay attention; disrupts the class or displays disrespectful behavior.