



## COURSE SYLLABUS

<b>Course:</b>	Biostatistics for Physiology and Biomedical Research
<b>Code:</b>	SCPS 691
<b>Credit:</b>	2 (2-0-4)
<b>Prerequisite:</b>	–
<b>Academic year:</b>	2024
<b>Semester:</b>	1 <sup>st</sup>
<b>Course Organizer:</b>	Asst. Prof. Nattapon Panupinthu, M.D., Ph.D.
<b>Room:</b>	Pr. 420, Department of Physiology, Faculty of Science, Mahidol University
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### Description

Biostatistics in biomedical science provides students with a comprehensive understanding of the principles and essential methods of statistical analysis in the field of biomedical science. This course introduces key concepts in biostatistics with emphasis on understanding the principles behind various statistical techniques and their appropriate applications. Upon completion, students gain the necessary skills to analyze, interpret and make conclusions from the raw data.

### Objectives:

In this course, students should be able to

1. Understand fundamental concepts in biostatistics in the field of biomedical research,
2. Develop critical thinking and problem-solving skills to apply statistical methods to biological and health-related data,
3. Communicate statistical findings effectively, and
4. Have ethical considerations in the data collection and analysis.

### Organization

This course is composed of four units. The first unit covers fundamental concepts in biostatistics related to the field of biomedical research. The second unit covers the use of

biostatistics in biomedical research involving analyses of images, biochemical assays and bioinformatics. The third unit covers the use of biostatistics in translational research. This part focuses on the ethical guidelines for numbers of animal use and experimentation. The fourth unit covers basics of statistics in clinical research regarding the study design and essential statistical tools.

### **Teaching and Learning Methods**

1. On-site lecture
2. Small group discussion
3. Self-study session
4. Take-home assignment, participation and quiz

### **Teaching Media**

1. Textbooks
2. Online resources
3. Statistical softwares

### **Classroom**

Room Pr.401, Department of Physiology, Faculty of Science, Mahidol University

### **Course Assessment**

Take-home assignment, participation and quiz are used to evaluate student achievement. Quizzes are used to assess the comprehension of key concepts and definitions. Participation during class and discussion is used to assess critical thinking and problem-solving skills as well as ability to communicate statistical concepts with clear explanations. Take-home assignments are given to present students with real-life research studies where statistical analysis is required. These assignments assess their ability to design analysis plan, apply statistical techniques and provide summary based on the results.

In each class, there are 10 marks for assignments and 10 marks for participation/quiz. At the end of the course, all marks are collected, and overall percentages are calculated. Grades are assigned as follow: A =  $\geq 80\%$ , B+ =  $\geq 75\%$ , B =  $\geq 70\%$ , C+ =  $\geq 65\%$ , C =  $\geq 60\%$ , F =  $< 60\%$ . Note, the minimum passing grade for M.Sc. and Ph.D. Programs in Physiology is B.

### **List of Instructors**

Faculty of Science, Mahidol University

Name	Department	Email
Prof. Dr. Narattaphol Charoenphandhu	Physiology	narattaphol.cha@mahidol.ac.th
Assc. Prof. Dr. Arthit Chairoungdua	Physiology	arthit.chi@mahidol.ac.th
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Asst. Prof. Dr. Nattapon Panupinthu	Physiology	nattapon.pan@mahidol.ac.th
Asst. Prof. Dr. Nittaya Boonmuen	Physiology	nittaya.bom@mahidol.ac.th
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Asst. Prof. Dr. Suntaree Unhapipat	Mathematics	suntaree.unh@mahidol.ac.th

#### Faculty of Medicine, Siriraj Hospital, Mahidol University

Name	Affiliation	Email
Assc. Prof. Dr. Varodom Charoensawan	Division of Medical Bioinformatics	varodom.cha@mahidol.ac.th

#### Faculty of Physical Therapy, Mahidol University

Name	Affiliation	Email
Asst. Prof. Dr. Petcharatana Bhuanantanondh	—	petcharatana.bhu@mahidol.edu

#### Teaching Schedule

Date	Time	Topic	Instructor
Tue, 20/08/2024	13:30 – 16:30	L1: Principles of Statistics in Biomedical Research	Suntaree
Wed, 28/08/2024	09:00 – 12:00	L2: Introduction to Analytical Software	Rachaneewan
Wed, 04/09/2024	09:00 – 12:00	L3: Image Acquisition and Analysis	Arthit
Wed, 11/09/2024	09:00 – 12:00	L4: Dose- and Time-dependent Assays and Analysis	Sunhapas
Wed, 25/09/2024	09:00 – 12:00	L5: Bioinformatics and Essential Analytical Tools	Varodom
Thu, 10/10/2024	09:00 – 12:00	L6: Calculation of Sample Size in Animal Research	Tepmanas
Wed, 16/10/2024	09:00 – 12:00	L7: Essential Statistics for Animal Research	Nattapon
Wed, 30/10/2024	09:00 – 12:00	L8: Writing and Presentation of Statistical Analysis	Nittaya
Wed, 13/11/2024	09:00 – 12:00	L9: Essential Statistics for Clinical Study	Petcharatana
Wed, 04/12/2024	09:00 – 12:00	L10: Ethical Guidelines for Statistics in Biomedical Research	Narattaphol