Bachelor of Science Program in Bioinnovation (International Program) Program Level ☑ Bachelor ☐ Graduate Diploma ☐ Master ☐ Doctor
Course Title: Statistics Faculty of Science
Course Code: SCMA 192 Department of Mathematics

Course Specification

Section 1 General Information

1. Course Code and Title

Thai วทคณ ๑๙๒ สถิติศาสตร์
English SCMA 192 Statistics

2. Number of Credits 3 (3–0–6) credits
(Theory 3 hrs. Practice 0 hrs. Self-Study 6 hrs./week)

3. Curriculum and Course Type

3.1 Program Bachelor's Degree Program in Science and Technology (International Program)
3.2 Course Type ☑ Specific Course ☐ Compulsory Course ☐ Elective Course

4. Course Coordinator and Instructor

4.1 Course Responsible Instructor Dr. Wichanon Sae-jie
Department of Mathematics, Faculty of Science
4.2 Instructors Dr. Wichanon Sae-jie
Department of Mathematics, Faculty of Science
Tel. 02-201-5354 e-mail: wichanon.sae@mahidol.ac.th

5. Semester/Class Level

5.1 Semester Second / Class Level: Freshman
5.2 Number of Students Allowed Approximately 30 Students

6. Prerequisites

None.

7. Co-requisites

None.

8. Date of Preparation/Latest Revision of the Course Specifications

20 December 2025

Section 2 Course Goals and Course Description

1. Course Goals

Student will be able to demonstrate the understanding and skills in analyzing data by descriptive and inferential statistical methods. Student will learn the statistical foundation for subsequent courses and experience various statistical knowledge for their future careers.

2. Course Description

แนวคิดความน่าจะเป็นและการแจกแจงความน่าจะเป็นและการประยุกต์กับเหตุการณ์หลากหลาย การตีความค่าสถิติ สถิติพรรณนา การชักตัวอย่างเพื่อให้ได้ตัวแทนที่ดีของประชากรและการนำไปใช้ในการประมาณค่าและการทดสอบสมมุติฐาน การนำเสนอบทความหรืองานวิจัยที่ตีพิมพ์ตามความสนใจของกลุ่มนักศึกษาโดยวิธีเชิงสถิติ

Concepts and applications of probability and probability distributions in various events; interpretation of statistical values; descriptive statistics; sampling for good representatives of populations and its use in estimation and hypothesis testing; presentation of article or published research according to groups of student's interest by statistical methods

Section 3 Course Objectives, Course-level Learning Outcomes and Course Implementation

1. Course Objectives

Instructor expects students to acquire skills and knowledge as follows. Students should:

1. Explain probability concepts and descriptive statistics.
2. Choose appropriate estimation and hypothesis testing for a given data set using inferential statistics.

2. Course-level Learning Outcomes: CLOs

On completion of the course, the students will be able to:

1. CLO1 State probability concepts and probability distributions.
2. CLO2 Explain descriptive statistics.
3. CLO3 Choose an appropriate sampling method to represent the population.
4. CLO4 Select a suitable estimation and hypothesis testing for a given set of data.

3. How to organize learning experiences to develop the knowledge or skills stated in number 2 and how to measure the learning outcomes

CLOs	Teaching and learning experience management			Learning outcomes measurements		
	Interactive lecture	Problem based activities	Discussion	Individual assignment	Written exam	Group Project
CLO1	✓	✓		✓	✓	✓
CLO2	✓	✓		✓	✓	✓
CLO3	✓	✓		✓	✓	✓
CLO4	✓	✓	✓	✓	✓	✓

Section 4 Lesson Plan and Evaluation

1. Lesson Plan

Teaching Period	Date	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
			Theo-ry*	Prac-tice**		
1	9/1/2026	Introduction to Statistics	3:00		Lecture: ppt and lecture note	Dr. Wichanon Sae-jie
2	16/1/2026	Descriptive statistics	3:00			
3	23/1/2026	Probability & Basic Probability Theorem	3:00			
4	30/1/2026	Conditional Probability & Bayes' rule	3:00			
5	6/2/2026	Random variables	3:00			
6	11/2/2026	Expected value and Variance	3:00			
7	20/2/2026	Discrete distributions I	3:00			
8	27/2/2026	Discrete distributions II	3:00			
9	Midterm Examination					
10	13/3/2026	Continuous distributions	3:00		Lecture: ppt and lecture	Dr. Wichanon Sae-jie
11	20/3/2026	Continuous distributions	3:00			
12	27/3/2026	Sampling distributions and Estimation	3:00			

Teaching Period	Date	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
			Theo-ry*	Prac-tice**		
13	3/4/2026	Confidence intervals	3:00		note	
14	10/4/2026	Hypothesis testing I	3:00			
15	17/4/2026	Hypothesis testing II	3:00			
16	24/4/2026	Group Project	3:00		Presenta-tion: ppt	
		Total	45:00			

2. Plan for Assessment of Expected Course-Level Learning Outcomes (CLOs)

2.1 Measurement and Evaluation of learning achievement

A. Formative Assessment

During a lesson, instructor keeps the question going and monitors students' progress in general. There are also quick quizzes to check the current understanding of individual students.

B. Summative Assessment

(1) Tool and weight for measurement and evaluation

Learning Outcomes	Evaluation Method*			Weight (Percentage)
	Individual assignment	Group Project	Written exam	
CLO1: State probability concepts and probability distributions.	5%	5%	20%	30%
CLO2: Explain descriptive statistics.	5%	5%	10%	15%
CLO3: Choose an appropriate sampling method to represent population.	5%	5%	15%	25%
CLO4: Select a suitable estimation and hypothesis testing for a given set of data.	5%	5%	15%	25%
Total	**20%**	**20%**	**60%**	**100%**

(2) Grading Rules

Students are evaluated their performance using assessment rubric according to course objectives and learning outcomes. Rubric scores for a single piece of individual assignment

Score	Description
20	Demonstrates the required work for all questions.
16	Demonstrates the required work for most questions with lower than 25% mistakes.
12	Demonstrates the required work for many questions with lower than 50% mistakes.
8	Demonstrates the required work for some questions with more than 50% mistakes.
4	Demonstrates the required work for few questions with more than 75% mistakes.
0	No response

(3) Measurement and Evaluation

The percentage of individual work is the average rubric scores of all pieces of individual work. After completion of the evaluation process, each student is assigned a criterion-referenced grade (as shown in the table below). Evaluation and achievement will be justified according to Faculty and University code, conducted by the grading system of A, B+, B, C+, C, D+, D and F, based on the table below, in which case, a student must earn a grade of at least D to pass this course.

Total percentage of evaluation	Grade
80– 100	A
71 – 79	B+
66 – 70	B
60 – 65	C+
50 – 59	C
45 – 49	D+
35 – 44	D
0 – 34	F

2.2 Re-examination (if the course allows any.)

None.

3. Students' Appeal

Students may submit formal complaint or academic appeal directly to
International Education and Administration Unit**,** Division of Salaya Campus
Room SC1-116, SC1-Building, Faculty of Science (Salaya Campus), Mahidol University
999 Phuttamonthon 4 Road, A. Phuttamonthon, Nakhon Pathom 73170, Thailand
E-mail: scsim@mahidol.ac.th; Phone: + 66 2 4419820 ext. 1199.

If it is considered that a case exists, the matter will be investigated in accordance with the procedures, and the complainant informed of the outcome

Section 5 Teaching Resources

1. Required Texts

1) Walpole, R.E. et al. **Probability & Statistics for Engineers & Scientists**, 9th edition, Pearson Prentice Hall, NJ, USA; 2016.

2) Weiss, Neil A., **Introductory statistics**, 10th ed., Addison-Wesley; 2015.

3) Schaum's outlines, Probability and Statistics, 4 th edition, McGraw-Hill; 2013.

2. Suggested Materials

1) Allan G. Bluman, **Elementary Statistics (A step by step approach)**, 5th edition, McGraw-Hill; 2004.

2) Johnson, Richard A., **Statistics: principles and methods**, 8th ed., John Wiley & Sons; 2019.

3. Other Resources (if any)

1). https://www.coursera.org

2) https://www.statistics.com

Section 6 Evaluation and Improvement of Course Implementation

1. Analysis and Evaluation of Course Implementation

A. Data for Analysis

Evaluated by course evaluation by student (Mahidol University E-Evaluation System) and student performance

B. Course Effectiveness Evaluation

Evaluation of instructor and course through Mahidol University E-Evaluation System

2. Revision Process and Improvement Plan for Course Effectiveness

Course responsible faculty member and instructors review course effectiveness in achieving course learning outcomes using outputs from course and instructor evaluation (Mahidol University E-Evaluation System), student evaluation (Section 5), and formal complaint or academic appeal (if any) to determine further improvement plan.

3. The self-assessment report of the course

Course responsible faculty members and instructors revise and improve strategies by reviewing the output of the student evaluation. Review of turning-in individual work assignment quality as planned (Section 5) is used to adjust teaching method to enhance student's learning achievement.