



Program.....

Course Title Statistics

Course Code SCMA 192

Degree  Bachelor  Master  Doctoral

Faculty of Science

Department of Mathematics

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## TQF 3 Course Specification

### Section 1 General Information

#### 1. Course code and title

Thai	วทศณ ๑๙๒ สถิติศาสตร์
English	SCMA 192 Statistics

#### 2. Number of credits

3 (3–0–6) credits  
(Lecture 3 – Laboratory 0 – Self-study 6 hours/week)

#### 3. Program and category of the course

3.1 Program Bachelor's Degree Program in Science and Technology  
(International Program)

3.2 Category of the course Specific Courses

#### 4. Course responsible faculty member and instructors

##### 4.1 Course responsible faculty member

Asst. Dr. Kornkanok Bunwong  
Department of Mathematics, Faculty of Science  
Tel. 02-201-5340 e-mail: kornkanok.bun@mahidol.ac.th

##### 4.2 Instructors

Dr. Watthanan Jatuviriyapornchai  
Department of Mathematics, Faculty of Science  
Tel. 02-201-5356 e-mail: watthanan.jat@mahidol.ac.th

#### 5. Semester / Level of study

5.1 Semester Second Semester/ 2020

5.2 Number of student 30 students

#### 6. Pre-requisite

None

#### 7. Co-requisites

None

#### 8. Venue of study

Faculty of Science, Mahidol University, Salaya campus

#### 9. Date of preparation/ latest revision

January 2021



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## Section 2 Goals and Objectives

### 1. Course goals

Student will be able to demonstrate the understanding and skills in analysing 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. Objectives of development/revision

#### 2.1 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.

#### 2.2 Course-level learning outcomes: CLOs

After successful completion of this course, students should be able to:

1. CLO1 State probability concepts and probability distributions.
2. CLO2 Explain descriptive statistics.
3. CLO3 Select a suitable estimation and hypothesis testing for a given set of data.
4. CLO4 Select a suitable estimation and hypothesis testing for a given set of data.
5. CLO5 Develop the data-based problem solving skill.

## Section 3 Description and Implementation

### 1. Course description

แนวคิดความน่าจะเป็นและการแจกแจงความน่าจะเป็นและการประยุกต์กับเหตุการณ์หลากหลาย การตีความค่าสถิติ สถิติพรรณนา การชักตัวอย่างเพื่อให้ได้ตัวแทนที่ดีของประชากรและการนำไปใช้ในการประมาณค่าและการทดสอบสมมุติฐาน การนำเสนอบทความหรืองานวิจัยที่ตีพิมพ์ตามความสนใจของกลุ่มนักศึกษาโดยวิธีเชิงสถิติ



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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

## 2. Credit hours/Semester

Lecture (hours)	Laboratory/Field trip/Internship (hours)	Self-study (hours)
45 hours (3 hours / week)	None	90 hours (6 hours / week)

## 3. Number of hours that the instructors provide individual counseling and guidance

Instructors provide academic counseling and guidance to individual at least 1 hour/week or upon request during office hours (Monday-Friday).



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### Section 4 Development of Students' Learning Outcomes

**1. Short conclusion on knowledge or skills that the course intends to develop students**

After successful completion of this course, students should be able to:

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

**2. Method to evaluate students' learning outcome in this course and to evaluate the learning outcomes specified in the standard**

Course learning outcomes	Teaching strategies			Evaluation strategies			
	Interactive lecture	Problem based activities	Discussion	Assignment	Exams	Quizzes	Project
CLO1	✓	✓	✓	✓	✓	✓	✓
CLO2	✓	✓	✓	✓	✓	✓	✓
CLO3	✓	✓	✓	✓	✓	✓	✓
CLO4	✓	✓	✓	✓	✓	✓	✓
CLO5	✓	✓	✓				✓



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## Section 5 Teaching and Evaluation Plans

### 1. Teaching plan

Week	Topics	Number of hours		Teaching method/ Media	Instructors
		In-class activity	Lab		
1	Introduction to Statistics	2	0	Interactive & problem-based learning, Assignments	Dr. Watthanan Jatuviriyapornchai
2	Descriptive statistics	2	0		
3	Probability	2	0		
4	Conditional probability	2	0		
5	Random variables	2	0		
6	Expected value and Variance	2	0		
7	Discrete distributions	2	0		
8	Discrete distributions II	2	0		
9	Midterm examination				
10	Continuous distributions	2	0	Interactive & problem-based learning, Assignments, Discussion	Dr. Watthanan Jatuviriyapornchai
	Project: Introduction	2	0		
11	Sampling distributions	2	0		
	Project: Data Collection	2	0		
12	Confidence intervals	2	0		
	Project: Data Analysis I	2	0		
13	Hypothesis testing (I)	2	0		
	Project: Data Analysis II	2	0		
14	Hypothesis testing (II)	2	0		
	Project: Data Analysis III	2	0		
15	Hypothesis testing (III)	2	0		
	Project: Report Production	2	0		
16	Review	2	0		
	Project: Presentation	3	0		



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Week	Topics	Number of hours		Teaching method/ Media	Instructors
		In-class activity	Lab		
17	Final examination				
	Total	45	0		

## 2. Evaluation plan

### 2.1 Learning measurement and evaluation

#### 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) Evaluation methods and weight

Course learning outcomes	Evaluation methods				Weight (%)
	Assignment	Q&A	Exams	Project	
CLO1: State probability concepts and probability distributions.	8%	3%	15%	-	26%
CLO2: Explain descriptive statistics.	3%	1%	9%	7%	20%
CLO3: Choose an appropriate sampling method to represent population.	1%	1%	1%	1%	4%
CLO4: Select a suitable estimation and hypothesis testing for a given set of data.	8%	5%	25%	7%	45%
CLO5: Develop the data-based problem solving skill.	-	-	-	5%	5%
<b>Total</b>	<b>20%</b>	<b>10%</b>	<b>50%</b>	<b>20%</b>	<b>100%</b>



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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
10	Demonstrates the required work for all questions.
8	Demonstrates the required work for most questions with lower than 25% mistakes.
6	Demonstrates the required work for many questions with lower than 50% mistakes.
4	Demonstrates the required work for some questions with more than 50% mistakes.
2	Demonstrates the required work for few questions with more than 75% mistakes.
0	No response

(2) Grading system

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 justify according to Faculty and University code, conducted by grading system of A, B+, B, C+, C, D+, D and F.

Total percentage of evaluation	Grade
80– 100	A
75– 79	B+
70 – 74	B
65 – 69	C+
60 – 64	C
55 – 59	D+
50 – 54	D
0 – 49	F

To pass this course, student must earn a grade of at least D.

(3) Re-exam (if any)

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### 3. Academic 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 6 Teaching Materials and Resources

### 1. Textbooks and required documents

1. Walpole, R.E. et al. **Probability & Statistics for Engineers & Scientists**, 9th edition, Pearson 2016.
2. Weiss, Neil A., **Introductory statistics**, 10th ed., Addison-Wesley; 2015.
3. De Veaux, R. **Stats: Data and Models**, 5th ed., Pearson 2019

### 2. Suggested Materials

1. Johnson, Richard A., **Statistics: principles and methods**, 8th ed., John Wiley & Sons; 2019.
2. Hogg, Robert V., **Probability and statistical inference**, 9th ed., Pearson; 2014.
3. Mendenhall, William., **Probability and statistics**, 15th ed., Cengage Learning; 2019.

### 3. Electronic information and websites

1. [khanacademy.org](http://khanacademy.org)
2. [wikipedia.org](http://wikipedia.org)





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## Section 7 Evaluation and Improvement of Course Management

### 1. Strategies for effective course evaluation by students

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

### 2. Evaluation strategies in teaching methods

Evaluated by course evaluation by student (Mahidol University E-Evaluation System) and student performance (Section 5)

### 3. Improvement of teaching methods

Course responsible faculty member and instructors revise and improve strategies by reviewing of 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.

### 4. Evaluation of students' learning outcomes

Analysis of students' learning outcomes using student's total percentage of evaluation taken from review of class attendance record, review of on-time assignment submission review of individual response according to examination rules and regulations, review of turning-in individual work assignment quality, and written examination by the course responsible faculty member and instructors. The evaluation results are peer-reviewed the international committee for undergraduate study of the Industrial Engineering Department.

### 5. Review 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.



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## Appendix

### Alignment between course and program

**Table 1** Curriculum mapping of course learning outcomes (CLOs) to program learning outcomes (PLOs)

The PLOs in the table are the program learning outcomes of .....(title of the program).....

Course title: Statistics	Program learning outcomes							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
Course code: SCMA 192								

**Table 2** Alignment between CLOs and PLOs

Course code: SCMA 192	Program learning outcomes							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CLO1: Use probability concepts and probability distributions with real world applications.								
CLO2: Explain descriptive statistics.								
CLO3: Choose an appropriate sampling method to represent population.								
CLO4: Select a suitable estimation and hypothesis testing for a given set of data.								
CLO5: Develop the data-based problem solving skill.								

The course learning outcomes is introductory level (I).



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**Table 3** PLOs and SubPLOs

PLOs	SubPLOs
PLO1 .....	1.1 .....
	1.3 .....
	1.4 .....
PLO3 .....	3.4 .....
PLO4 .....	4.2 .....
PLO7 .....	7.2 .....