TQF3 Course Specification

0504103
Biostatistics for Public Health Research

Master of Public Health
Faculty of Health and Sports Science
Thaksin University
2022

TQF3 Course specification

Section 1 General information

1. **Course code and title**
   0504103 Biostatistics for public health research
2. **Total Credits** 3(2-2-5)
3. **Curriculum and course type**
   3.1 Curriculum Master degree program (Thai)
   3.2 Course type Specific course ☑ Compulsory course ❑ Electives
4. **Course coordinator and lecturer**
   Asst. Prof. Dr. Tum Boonrod, Tel. 0895970405, E-mail: btum@tsu.ac.th
5. **Semester/Year of study**
   1st year 2nd semester 2023
   Number of students allowed approximately 10 students
6. **Pre-requisite:** None
7. **Co-requisites:** None
8. **Study site location**
   Faculty of health and sports science, Thaksin University, Phatthalung, Thailand.
9. **Latest revision of the course specifications**
   15 October 2023

Section 2 Aims and objectives

1. **Course goals**

To provide students with knowledge and understanding of the principles and methods of statistics, including descriptive and inferential statistics, data analysis using statistical program and the interpretation of data analysis results which will lead to the appropriate decision making in health system management.

2. **Course-level learning outcomes: CLOs**

CLO1 Demonstrate an understanding of the professional and ethical standards for handling of data (PLO1)

CLO2 Distinguish between different statistical tests, especially in terms of application and interpretation (PLO2)

CLO3 Identify appropriate statistical techniques and their application to health science research and practice (PLO2)

CLO4 Critique health science research on the basis of its statistical methods, analysis and interpretation (PLO3)

CLO5 Perform appropriate statistical analysis using common statistical software and interpret the results (PLO4)

Section 3 Course description and implementation

1. **Course description**

Using statistics for hypothesis testing, estimation, analysis of mean difference and proportion, test of regression analysis and correlation, non parametric statistics, sample size, data interpretation and presentation and practice in data analysis by using statistical analysis programs

2. **Number of hours per semester**

Theory (hours)	**Practice** (hours)	**Self-study** (hours)
30	30	75

3. Number of hours provided for academic advice and guidance to students

Students can contact the instructor through the following channels:
1) Email: btum@tsu.ac.th
2) Face-to-face consultation in the office or online by appointment

Section 4 Development of the expected learning outcomes

1. A brief summary of the knowledge or skills expected to develop in students; the course-level expected learning outcomes (CLOs)

CLO1 Demonstrate an understanding of the professional and ethical standards for handling of data (PLO1)
CLO2 Distinguish between different statistical tests, especially in terms of application and interpretation (PLO2)
CLO3 Identify appropriate statistical techniques and their application to health science research and practice (PLO2)
CLO4 Critique health science research on the basis of its statistical methods, analysis and interpretation (PLO3)
CLO5 Perform appropriate statistical analysis using common statistical software and interpret the results (PLO4)

2. How to organize learning experiences to develop the knowledge or skills stated in number 1 and how to measure the learning outcomes

CLOs	Teaching/learning experience management	Learning outcomes measurements
CLO1 (PLO1)	1. Case Study discussion 2. Think-Pair-Share	Teachers Behavior and Students Classroom Participation
CLO2 (PLO2)	1. Collaborative teaching 2. Case Study discussion	1. Midterm and Final examination 2. Report
CLO3 (PLO2)	1. Collaborative teaching 2. Case Study discussion 3. Practice data analysis	1. Midterm and Final examination 2. Assignment
CLO4 (PLO3)	1. Case Study discussion 2. Think-Pair-Share	Critique a research paper (Report and Presentation)
CLO5 (PLO4)	1. Case Study discussion 2. Practice data analysis	Practice of data analytics (Assignments) and Practicum in statistical consulting

Section 5 Teaching and evaluation plans

1. Lesson plan

No.	Topics/Details	Number of hours		Teaching & Learning activities	Lecturer
		Theory	Practice		
1	**Chapter 1 Introduction to biostatistics** ▪ Concepts of statistical methods ▪ Variables, Measurement scales, Population and sample size, Parameter and statistics ▪ Descriptive statistics and Inference statistics	1:00 1:00 -	- - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
2	**Chapter 2 Descriptive Statistics** ▪ Measures of central tendency ▪ Measures of dispersion	1:00 1:00 -	- - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
3	**Chapter 3 Basic probability concepts** ▪ Two views of probability: objective and subjective ▪ Elementary properties of probability ▪ Calculating the probability of an event ▪ Bayes' theorem	1:00 1:00 -	- - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
4	**Chapter 4 Probability distribution** ▪ Probability distributions of discrete variables ▪ Continuous probability distributions	1:00 1:00 -	- - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
5	**Chapter 5 Sampling Distribution** ▪ Distribution of the sample mean **Chapter 6 Estimation** ▪ Point estimation and Confidence interval	1:00 1:00 -	- - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
6	**Chapter 7 Hypothesis** ▪ Hypothesis Testing Steps ▪ understand the concepts of type I error, type II error, and the power of a test.	1:00 1:00 -	- - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
7-8	**Chapter 8 Analysis of continuous outcome** ▪ One group ▪ Two groups ▪ Three groups or more ▪ Nonparametric statistics	0:30 1:00 0:30 -	- - - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Think-Pair-Share 4. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
	Midterm				

No.	Topics/Details	Number of hours		Teaching & Learning activities	Lecturer
		Theory	Practice		
9-10	**Chapter 9 Analysis of categorical outcome** ▪ One group ▪ Two groups ▪ Three groups or more ▪ Nonparametric statistics	0:30 1:00 0:30 -	- - - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Think-Pair-Share 4. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
11-12	**Chapter 10 Correlation and Linear Regression** ▪ Correlation ▪ Linear regression	0:30 1:00 0:30 -	- - - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Think-Pair-Share 4. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
13-14	**Chapter 11 The chi-square Distribution and Logistic regression** ▪ Chi-square test ▪ Logistic regression	0:30 1:00 0:30 -	- - - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Think-Pair-Share 4. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
15	**Chapter** 1**2 Sample Size Determination**	0:30 1:00 0:30 -	- - - 2:00	1. Collaborative teaching 2. Case Study discussion 3. Think-Pair-Share 4. Practice of data analytics	Asst. Prof. Dr.Tum Boonrod
16	**Presentation of critical appraisal of research articles**	1:00 1:00 -	- - 2:00	1. Case Study discussion 2. Think-Pair-Share	Asst. Prof. Dr.Tum Boonrod
Final examination					
	Total	**30**	**30**		

2. Plan for assessment of expected course-level learning outcomes (CLOs)

2.1 Measurement and evaluation of learning achievement

A. Formative assessment

The assessment is performed during the course to measure the progress and development of students' learning by observing the behavior change and improvement of students' behavior and performance. The assessment results will be notified to the students (feedback) so that the students are constantly able to improve themselves. The assessment results are not included with the test scores at the end of the course.

B. Summative assessment

(1) Tool and weight for measurement and evaluation

Evaluation methods	Learning outcomes	Proportion of evaluation (%)
Student's response and behavior in the classroom	CLO 1 (PLO1)	5
Midterm	CLO 2 (PLO2) & CLO 3 (PLO2)	25
Final examination	CLO 2 (PLO2) & CLO 3 (PLO2)	25
Presentation of critical appraisal of research articles and Report	CLO 4 (PLO3)	10
Practice of data analytics (Assignments)	CLO 5 (PLO4)	25
Practicum in statistical consulting	CLO 5 (PLO4)	10
Total		**100**

(2) Measurement and evaluation
The grading symbols are: A: ≥80, B+: ≥75, B: ≥70, C+: ≥65, C: ≥ 60, D+: ≥ 55, D: ≥ 50, F: < 50

3. Students' appeal

Should the students have any suspicion or appeals to the teaching and learning activities and the grade assessment, students could make the appeal by filling in the form at FHSS TSU' Academic Affairs. The appeal will be proposed to the course coordinator to consider the request. If the appeal could not be addressed at this point, it will be further process by the program's Teaching and Learning Development Committee. In case that the committee suggested further investigation should be done, the appeal will be purposed to the faculty's appealing committee to address the issue.

Section 6 Teaching & Learning resources

1. Required texts

Daniel, W.W., Biostatistics : a foundation for analysis in the health science (10th ed.). USA: John Wiley; 1999.
Suárez EL, Pérez CM, Nogueras GM, Moreno-Gorrín C. Biostatistics in public health using STATA. CRC Press; 2016 Mar 24.
Bland M. An introduction to medical statistics: Oxford university press; 2015.
Moore, D. S., Notz, W., & Fligner, M. A. The basic practice of statistics New York, NY: Macmillan Education.; 2018.

2. Suggested materials

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Section 7 Course evaluation and Improvement

1. Evaluation strategies for course effectiveness by students

a. Assessment of lecturer's teaching outcome
b. Course evaluation
c. Reflection on learning

2. Teaching evaluation strategies

a. lecturers evaluate their teaching
b. Examination results/student's learning outcome
c. Students reflections on learning

3. Teaching improvement

a. The collection of results of teaching evaluation, course evaluation and suggestions
b. Seminar among instructors to learn from each other to improve teaching and the course

4. Verification of students achievements in the course

a. Thereare committees in the field verifying students' scores and grades with examinations, exercises, reports and presentations.
b. Report the results of the verification to the graduate studies committee

5. Course review and improvement plan for course effectiveness

Data from students' reflections and course evaluation will be used to improve the course effectiveness.