# COURSE SPECIFICATION

**Name of Institution** Mahidol University
**Campus/Faculty/Program** ASEAN Institute for Health Development

## Section 1 General Information

1. **Code and Course Title:** ADPM 664 Applied Statistics for Primary Health Care Research
สอสม ๖๖๔ สถิติประยุกต์สำหรับการวิจัยทางการสาธารณสุขมูลฐาน

2. **Total Credits:** 3 (3-0-6) credits (Lecture - Practice - Self Study)

3. **Curriculum and Course Category**
Master of Primary Health Care (International Program) (Elective Course)

**4. Course Coordinator/Course Instructors**

**4.1 Course Coordinator**

Assoc.Prof.Dr.Piyapong Janmaimool
Contact: ASEAN Institute for Health Development
Tel. 02 441 9040 ext 25

**4.2 Course Instructors**

Assoc.Prof. Dr.Piyapong Janmaimool
e-mail: piyapong.jan@mahidol.ac.th
Assoc.Prof. Dr. Orapin Laosee
e-mail: oraping.lao@mahidol.edu
Assoc.Prof. Dr. Aroonsri Mongkolchati
e-mail: aroonsri.mon@mahidol.edu
Asst.Prof. Somsak Wongsawass
e-mail: somsak.won@mahidol.edu

**5. Semester / Academic Year of Study:** 2/2023

**6. Pre-requisite:** There are no specific prerequisite courses, but learners must be able to work with equations and perform basic mathematical calculations.

**7. Co-requisite:** none

**8. Venue:** ASEAN Institute for Health Development, Mahidol University

**9. Latest Date of Course Specification Development or Modification:** 1 September 2023

## Section 2 Aims and Objectives

**1. Course Aims**

Upon successful completion of this course, the learners will be able to:

1.1 Describe the theoretical foundations for different statistical techniques

1.1 Select the most appropriate statistical approach for analyzing data from applied primary health care research.

1.2 Perform a statistical analysis of data from applied primary health care research.

1.3 Interpret the results from statistical analysis of data from applied primary health care research.

1.4 Write statistical reports in a proper academic form.

**2. Objectives of Course Development/Modification**

This course is designed to build statistical skills for primary health care research. Learners will be trained to conduct data analyses by using various types of statistical techniques that they can apply to their research projects related to primary health care issues. This course primarily aims to equip learners with the basic and advanced expertise needed to investigate and describe data and complex relationships between variables in a dataset, and to enable learners to create statistical reports in a suitable academic form.

## Section 3 Course Description and Implementation

**1. Course Description**

Principles of applied statistics in primary health care research, descriptive and inferential statistics, parametric and non-parametric statistics, hypothesis testing for population means and proportions, analysis of variance, correlation analysis and multiple regression, Chi-square test and multiple logistic regression, path analysis, factor analysis, structural equation model (SEM), selecting appropriate statistical methods, data analysis using Statistical Package for the Social Sciences (SPSS) software and AMOS (Analysis of Moment Structure).

หลักการของสถิติประยุกต์ในงานวิจัยทางการสาธารณสุขมูลฐาน สถิติเชิงพรรณนาและสถิติเชิงอ้างอิง สถิติแบบพาราเมตริกและนอนพาราเมตริก การทดสอบสมมติฐานสำหรับค่าเฉลี่ยของประชากรและสัดส่วนประชากร การวิเคราะห์ความแปรปรวน การวิเคราะห์สหสัมพันธ์และการถดถอยพหุคูณ การทดสอบไคสแควร์และการถดถอยลอจิสติคพหุคูณ การวิเคราะห์เส้นทาง การวิเคราะห์ปัจจัย การวิเคราะห์โมเดลสมการโครงสร้าง การเลือกใช้วิธีสถิติที่เหมาะสมกับงานวิจัย การวิเคราะห์ข้อมูลโดยใช้โปรแกรมสถิติสำเร็จรูปเพื่อการวิจัยทางสังคมศาสตร์และโปรแกรมเอมอส

**2. Number of Hours per Semester**

| | | |
|---|---|---|
| Lecture | 45 | Hours |
| Tutorial | 0 | Hour |
| Practice / Field Experience /Practicum | 0 | Hour |
| Self-Study | 90 | Hours |

**3. Number of hours provided for academic advice and guidance to an individual student**

Every Tuesday 14.00-16.00 at Building 1, 2nd floor ASEAN Institute for Health Development; Office hours (at least 2 hours/week)

## 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)

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

CLO1 Describe the theoretical foundations for different statistical techniques

CLO2 Select the most appropriate statistical approach for analyzing data from applied primary health care research.

CLO3 Perform a statistical analysis of data from applied primary health care research.

CLO4 Interpret the results from statistical analysis of data from applied primary health care research.

CLO5 Write statistical reports in a proper academic form.

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 and learning experience management | | | Learning outcomes measurements | | | |
|---|---|---|---|---|---|---|---|
| | Lecture | Individual Work | Group Work | Test | Assignment quality | Individual Reports | Group Reports |
| CLO1 | x | | | x | x | | |
| CLO2 | x | | | x | x | | |
| CLO3 | x | x | x | | x | x | x |
| CLO4 | x | x | x | | x | x | x |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CLO5 | x | x | | | x | x | |

## Section 5 Teaching Plan and Evaluation Plan

1. Teaching Plan

| Week No. | Topic | Hrs. | | | Teaching and Learning Activities | Instructor(s) |
|---|---|---|---|---|---|---|
| | | Lecture | Practice | Self-study | | |
| 1 | Introduction to the course and overviews of statistics applied for primary health care research<br>- Types of variables<br>- Hypothesis tests | 3 | 0 | 6 | Lecture, Discussion | Assoc.Prof. Dr. Piyapong Janmaimool |
| 2 | Data cleaning and management for the analyses by SPSS | 3 | 0 | 6 | Lecture, Class activities, Assignments | Assoc.Prof. Dr. Aroonsri Mongkolchati |
| 3 | Reliability test and normality test & descriptive analysis | 3 | 0 | 6 | | Assoc.Prof. Dr. Aroonsri Mongkolchati |
| 4 | Statistical inference for a continuous outcome 1: parametric tests<br>- Independent populations: independent t-test, ANOVA<br>- Dependent populations: paired t-test, repeated measures ANOVA | 3 | 0 | 6 | | Assoc.Prof. Dr. Piyapong Janmaimool |
| 5 | Statistical inference for a continuous outcome 2:<br>non-parametric tests<br>- Independent populations: Mann-Whitney U test, Kruskal-Wallis analysis of variance for ranks<br>- Dependent populations: Wilcoxon signed-rank test, Friedman's test. | 3 | 0 | 6 | | Asst.Prof. Somsak Wongsawass |

| Week No. | Topic | Hrs. | | | Teaching and Learning Activities | Instructor(s) |
|---|---|---|---|---|---|---|
| | | Lecture | Practice | Self-study | | |
| 6 | Statistical inference for two qualitative variables: Chi-square test, Fisher's exact test, and Bivariate analysis | 3 | 0 | 6 | | Assoc.Prof. Dr. Orapin Laosee |
| 7 | Statistical inference for two quantitative variables: Pearson correlation and Simple linear regression | 3 | 0 | 6 | | Assoc.Prof. Dr. Piyapong Janmaimool |
| 8 | Multiple Logistics Regression 1 | 3 | 0 | 6 | Lecture, Class activities, Individual presentation | Assoc.Prof. Dr. Orapin Laosee |
| 9 | Multiple Logistics Regression 2 | 3 | 0 | 6 | | Assoc.Prof. Dr. Orapin Laosee |
| 10 | Multiple Linear Regression | 3 | 0 | 6 | Lecture, Class activities | Assoc.Prof. Dr. Piyapong Janmaimool |
| 11 | Factor analysis 1 (AMOS) | 3 | 0 | 6 | Lecture | Assoc.Prof. Dr. Piyapong Janmaimool |
| 12 | Factor analysis 2 (AMOS) | 3 | 0 | 6 | Lecture, Class activities | Assoc.Prof. Dr. Piyapong Janmaimool |
| 13 | Path analysis (AMOS) | 3 | 0 | 6 | Lecture, Class activities | Assoc.Prof. Dr. Piyapong Janmaimool |
| 14 | Structural Equation Model 1 (AMOS) | 3 | 0 | 6 | Lecture | Assoc.Prof. Dr. Piyapong Janmaimool |
| 15 | Structural Equation Model 2 (AMOS) | 3 | 0 | 6 | Class activities | Assoc.Prof. Dr. Piyapong Janmaimool |
| | total | 45 | 0 | 90 | | - |

**2. Evaluation Plan**

| No. | Learning Outcomes | Evaluation Method | Week of Evaluation | Evaluation Allotment |
|---|---|---|---|---|
| 1. | Describe the theoretical foundations for different statistical techniques | Quiz | Week 2 | 10% |
| | | Assignments | Week 2,3,4,5,6 | 10% |
| 2. | Select the most appropriate statistical technique for analyzing data in primary health care research | Quiz | Week 7,8 | 10% |
| | | Assignments | Week Week 2,3,4,5,6 | 10% |
| 3. | Conduct a statistical analysis of data from applied primary health care research. | Assignments | Week 4,5,7,10 | 10% |
| | | Individual Reports | Week 9,15 | 5% |
| | | Group Report | Week 13 | 5% |
| 4. | Interpret the results from statistical analysis of data from an applied primary health care research | Assignments | Week 4,5,7,10 | 10% |
| | | Individual Reports | Week 9,15 | 5% |
| | | Group Report | Week 13 | 5% |
| 5. | Write statistical reports in a proper academic form | Assignment | Week 9,10,12,13,15 | 10% |
| | | Individual Reports | Week 9,15 | 10% |

**1. Measurement and evaluation of student achievement**

A = 85-100 %
B+ = 75– 84 %
B = 65 – 74 %
C+ = 55 – 64 %
C = 45 – 54 %
F = 0- 44 %

## Section 6 Teaching Materials and Resources

1. Main Textbook and Course Materials

Field, A. (2009). Discovering statistics using SPSS (3rd Edition). London: Sage.
Cronk, Brian. (2004). How to use SPSS (3rd Edition). United States of America: Pyrczak.
Spiers, N., Manktelow, B., Hewitt, M. J. The NIHR RDS EM / YH for Research and Development in Primary Health Care: Using SPSS. The NIHR RDS EM / YH, 2007

Wayne W. Daniel and Chad L. Cross. (2013). Biostatistics: A Foundation for Analysis in the Health Sciences

**2. Important Documents and Information**

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**3. Suggested Learning Resources**

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## Section 7 Course Evaluation and Improvement

1. Evaluation Strategies for Course Effectiveness by Students

Strategies for effective course evaluation by students

1.1 Evaluation of students by peer students to be done by the Faculty of Graduate Studies (Education Services Section)

1.2 Student evaluation to be done by Course Directors at the end of the course

- Course content
- Course management
- Suggestions
- Overall opinion

2. Teaching Evaluation Strategies

- Observation of student behaviors, attitudes, and academic contents during activities of class participation
- Students self-assessments and analysis
- Peer assessments and feedback
- Question and answer
- Volunteering in class organization and designing in summarization of class activities

3. Teaching Improvement

Presentation of course development, techniques used in teaching, and improvement with the participation of program management committee members of AIHD at program management committee meetings.

4. Verification of Students Achievements in the Course

- Analysis of students' learning outcomes using scores from class attendance, individual report activity and presentation

- Observing changes in perception and attitude of individual students and development i.e. personality, presentation, participation in working group, participatory action

5. Course Revision and Improvement Plan
   - Meeting with all lecturers teaching the course to discuss and review the course before the semester starts and before each period of teaching
   - Teaching materials sharing among lecturers for mutual learning, understanding, and development
   - Meeting with all lecturers teaching the course to discuss and review after the course closed to consider requests, feedback, and suggestions of students and make minor improvements to the course syllabus and materials before the next academic year.

# Appendix

## Relations between the Course and the Program

**Program Learning Outcomes**

PLO1 Exhibit responsibility, discipline, and honesty according to organizational rules, academic and professional ethics, and morality.

PLO2 Explain the interconnection of multidisciplinary knowledge associated with primary health care management.

PLO3 Design research in primary health care management based on systematic process.

PLO4 Defend in significant ways with questions or points of view or controversies about the area of the primary health care system.

PLO5 Interact professionally when working as a team as both leader and member for solving and managing work assigned.

PLO6 Perform statistical data analysis as they support evaluating, planning, and managing the primary health care system.

PLO7 Communicate clearly and effectively to an array of audiences for a range of purposes.

PLO8 Use information technology effectively to support the study, research, and their efforts to accomplish a specific purpose.

| Course | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 |
|---|---|---|---|---|---|---|---|---|
| **Elective course** | | | | | | | | |
| ADPM 664 Applied Statistics for Primary Health Care Research 3 (3-0-6) | | | R | | | P | | P |
| | | | | | | | | |

I = ELO is introduced & assessed P = ELO is practiced & assessed

R =ELO is reinforced & assessed M = Level of Mastery is assessed

## Curriculum Mapping

● Primary responsibility O Secondary responsibility

| Course Learning Outcomes (CLOs) | Program learning domains | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1. Morality and ethics | | | 2. Knowledge | | 3. Intellectual skills | | | 4. Interpersonal Skills and Responsibility | | 5. Numeral Analysis Skills, Communication and Use of Information Technology | | |
| | 1.1 | 1.2 | 1.3 | 2.1 | 2.2 | 3.1 | 3.2 | 3.3 | 4.1 | 4.2 | 5.1 | 5.2 | 5.3 |
| 1. Describe the theoretical foundations for different statistical techniques | ● | O | ● | ● | O | ● | O | O | O | O | O | ● | O |
| 2. Select the most appropriate statistical approach for analyzing data from applied primary health care research. | O | ● | O | O | ● | O | ● | ● | O | O | ● | O | O |
| 3. Perform a statistical analysis of data from applied primary health care research. | ● | ● | O | ● | ● | O | ● | O | ● | O | ● | O | ● |
| 4. Interpret the results from statistical analysis of data from applied primary | ● | ● | O | ● | O | O | ● | O | ● | O | ● | ● | ● |

| Course Learning Outcomes (CLOs) | Program learning domains | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1. Morality and ethics | | | 2. Knowledge | | 3. Intellectual skills | | | 4. Interpersonal Skills and Responsibility | | 5. Numeral Analysis Skills, Communication and Use of Information Technology | | |
| | 1.1 | 1.2 | 1.3 | 2.1 | 2.2 | 3.1 | 3.2 | 3.3 | 4.1 | 4.2 | 5.1 | 5.2 | 5.3 |
| health care research. | | | | | | | | | | | | | |
| 5. Write statistical reports in a proper academic form. | O | ● | O | ● | O | ● | O | O | O | O | O | ● | ● |

*Expected Outcome (TQF.2)*

**1. Morality and Ethics**

1.1 Exhibits discipline, honesty, and punctuality

1.2 Behave according to morals and ethics of academic and professional practice

1.3 Avoid academic plagiarism

**2. Knowledge**

2.1 Explain the theoretical and practical knowledge associated with primary health care management

2.2 Explain the interconnection of various fields of knowledge in primary health care management

**3. Intellectual skills**

3.1 Perform the manners of continuously seeking knowledge

3.2 Design the research to solve the problem identified in the primary health care management system

3.3 Defend in significant ways with questions or points of view or controversies in related fields.

**4. Interpersonal Skill and Responsibility**

4.1 Perform interpersonal communication skills to establish and enhance personal and work-based relationships.

4.2 Perform the role of a leader and working team member appropriately

**5. Numeral Analysis Skills, Communication, and Use of Information Technology**

5.1 Demonstrate the statistical analysis and its interpretation

5.2 Communicate clearly and effectively to an array of audiences for a range of purposes.

5.3 Use information technology effectively to support the study, research, and efforts to accomplish a specific purpose

## Relations between CLOs and PLOs

| Course Objectives (PLOs) | PLOs | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 |
| 1. Describe the theoretical foundations for different statistical techniques | | | × | | | | | |
| 2. Select the most appropriate statistical approach for analyzing data from applied primary health care research. | | | | | | × | | |
| 3. Perform a statistical analysis of data from applied primary health care research. | | | | | | × | | |
| 4. Interpret the results from statistical analysis of data from applied primary health care research. | | | | | | | | × |
| 5. Write statistical reports in a proper academic form. | | | | | | | | × |

**Program Learning Outcomes**

PLO1 Exhibit responsibility, discipline, and honesty according to organizational rules, academic and professional ethics, and morality.

PLO2 Explain the interconnection of multidisciplinary knowledge associated with primary health care management.

PLO3 Design research in primary health care management based on systematic process.

PLO4 Defend in significant ways with questions or points of view or controversies about the area of the primary health care system.

PLO5 Interact professionally when working as a team as both leader and member for solving and managing work assigned.

PLO6 Perform statistical data analysis as they support evaluating, planning, and managing the primary health care system.

PLO7 Communicate clearly and effectively to an array of audiences for a range of purposes.

PLO8 Use information technology effectively to support the study, research, and their efforts to accomplish a specific purpose.