

## 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 654 Digital health and innovation for primary health care management  
สอสม

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

### 3. Curriculum and Course Category

Master of Primary Health Care Management (International) (Elective Course)

### 4. Course Coordinator/Course Instructors

#### 4.1 Course Coordinator

Lect Dr. Chanida Lertpitakpong

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Assoc.Prof. Dr.Orapin Laosee

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Invited lecturers

#### 4.2 Course Instructors

Lect Dr. Chanida Lertpitakpong

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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 important of digital health during the disruptive era
- 1.2 Identify the relevant technologies and telecommunication techniques to solve primary health care problem
- 1.3 Select the appropriate digital health to in different senario
- 1.4 Demonstrate how digital health could enabling data exchange for primary health care

### 2. Objectives of Course Development/Modification

This course is designed to introduce students the use of digital health, innovations for health care and primary health care management. The learners will expose to the information and communication technologies (ICT) in healthcare. Students will learn about the differing types of digital health, relevant technologies and telecommunication techniques including artificial intelligence, Internet of Things (IoT), and e-sensors for healthcare; virtual care; medical robotics and actuators; telemedicine; smart wearables for patient clinical monitoring; remote health promotion; hospital information.

## Section 3 Course Description and Implementation

### 1. Course Description

Digital health; disruptive technology; innovations for healthcare and primary health care management; artificial intelligence, Internet of Things (IoT), and e-sensors for healthcare; virtual care; medical robotics and actuators; telemedicine; smart wearables for patient clinical monitoring; remote health promotion; hospital information and management system; big data analysis; tools enabling data exchange.

สุขภาพดิจิทัล เทคโนโลยีสร้างความพลิกผัน นวัตกรรมสำหรับการดูแลสุขภาพและสาธารณสุขมูลฐาน ปัญญาประดิษฐ์ การเชื่อมโยงของอุปกรณ์อัจฉริยะทั้งหลายผ่านอินเทอร์เน็ต และการตรวจจับโดยใช้อิเล็กทรอนิกส์สำหรับการดูแลสุขภาพ การนำเทคโนโลยีต่างๆ ที่จะช่วยให้ผู้ป่วยและบุคลากรทางการแพทย์สามารถพูดคุยวินิจฉัยโรค หุ่นยนต์และตัวกระตุ้นทางการแพทย์ โทรเวชกรรม อุปกรณ์สวมใส่อัจฉริยะสำหรับการตรวจติดตามทางคลินิกของผู้ป่วย เทคโนโลยีนำพาคนไข้กับหมอใกล้ชิดกัน ระบบสารสนเทศและการจัดการโรงพยาบาล การวิเคราะห์ข้อมูลขนาดใหญ่ เครื่องมือที่ใช้สำหรับแลกเปลี่ยนข้อมูล

## 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 Friday 14.00-16.00 at Building 1, 2<sup>nd</sup> 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 important of digital health during the disruptive era

CLO2 Identify the relevant technologies and telecommunication techniques to solve primary health care problem

CLO3 Select the appropriate digital health to in different senario

CLO4 Demonstrate how digital health could enabling data exchange for primary health care

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                              | x                  | x                  |               |

|      |   |   |   |   |   |   |   |
|------|---|---|---|---|---|---|---|
|      |   |   |   |   |   |   |   |
| CLO2 | x | x |   | x | x | x |   |
| CLO3 | x |   | x |   | x |   | x |
| CLO4 | 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 Digital health for Primary Health Care Management                  | 3       | 0        | 6          | Lecture, Discussion              | Chanida Lertpitakpong |
| 2        | Disruptive technology and Its impact   | 3       | 0        | 6          | Lecture, exercise                | Chanida Lertpitakpong |
| 3        | innovations for healthcare and primary health care management                      | 3       | 0        | 6          | Lecture, case study              | Chanida Lertpitakpong |
| 4        | Artificial intelligence, Internet of Things (IoT), and e-sensors for healthcare I  | 3       | 0        | 6          | Lecture, Case study              | Chanida Lertpitakpong |
| 5        | Artificial intelligence, Internet of Things (IoT), and e-sensors for healthcare II | 3       | 0        | 6          | Lecture, discussion              | Chanida Lertpitakpong |
| 6        | Virtual care and case study  | 3       | 0        | 6          | Lecture, case study              | Orapin Laosee         |
| 7        | Medical robotics and actuators   | 3       | 0        | 6          | Lecture, exercise                | Orapin Laosee         |
| 8        | How to Telemedicine  | 3       | 0        | 6          | Lecture, discussion              | Chanida Lertpitakpong |
| 9        | Smart wearables for patient clinical monitoring                                    | 3       | 0        | 6          | Lecture, exercise                | Chanida Lertpitakpong |
| 10       | Remote health promotion  | 3       | 0        | 6          | Lecture, Case study              | Chanida Lertpitakpong |
| 11       | Hospital information and management system   | 3       | 0        | 6          | Lecture, discussion              | Guest lecture         |
| 12       | Management of big data analysis; tools enabling data exchange                      | 3       | 0        | 6          | Lecture, case study              | Guest lecture         |
| 13       | Digital solutions in the future of health  | 3       | 0        | 6          | Lecture,                         | Guest lecture         |

| Week No. | Topic                 | Hrs.    |           |              | Teaching and Learning Activities | Instructor(s)         |
|----------|-----------------------|---------|-----------|--------------|----------------------------------|-----------------------|
|          |                       | Lecture | Practic e | Self - study |                                  |                       |
|          | care                  |         |           |              | Case study                       |                       |
| 14       | Student presentations | 3       | 0         | 6            | Presentation                     | Chanida Lertpitakpong |
| 15       | Student presentations | 3       | 0         | 6            | Presentation                     | Chanida Lertpitakpong |
|          | Total                 | 45      | 0         | 90           |                                  | -                     |

## 2. Evaluation Plan

| No. | Learning Outcomes  | Evaluation Method  | Week of Evaluation | Evaluation Allotment |
|-----|--|--------------------|--------------------|----------------------|
| 1.  | Describe the important of digital health during the disruptive era                                       | Quiz               | 2                  | 10%                  |
|     |  | Assignments        | 5                  | 10%                  |
| 2.  | Identify the relevant technologies and telecommunication techniques to solve primary health care problem | Quiz               | 3                  | 10%                  |
|     |  | Assignments        | 4                  | 10%                  |
| 3.  | Select the appropriate digital health to in different senario  | Assignments        | 7, 9               | 5%                   |
|     |  | Individual report  | 11                 | 25%                  |
| 4.  | Demonstrate how digital health could enabling data exchange for primary health care                      | Assignment         | 12-13              | 5%                   |
|     |  | Group presentation | 14-15              | 25%                  |

## 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

1. Bai, X., et al. (2024). "Digital Health Interventions for Chronic Wound Management: A Systematic Review and Meta-Analysis." Journal of Medical Internet Research **26**(1).
2. Liang, F., et al. (2024). "Applications of digital health approaches for cardiometabolic diseases prevention and management in the Western Pacific region." The Lancet Regional Health - Western Pacific **43**
3. El-Tallawy, S. N., et al. (2024). "Innovative Applications of Telemedicine and Other Digital Health Solutions in Pain Management: A Literature Review." Pain and Therapy **13**(4): 791-812.
4. Morris, T., et al. (2023). "The Impact of Digital Health Interventions for the Management of Type 2 Diabetes on Health and Social Care Utilisation and Costs: A Systematic Review." PharmacoEconomics - Open **7**(2): 163-173.
5. Mair, J. L., et al. (2023). "Effective Behavior Change Techniques in Digital Health Interventions for the Prevention or Management of Noncommunicable Diseases: An Umbrella Review." Annals of Behavioral Medicine **57**(10): 817-835.
6. Fatoye, F., et al. (2023). "Economic Evaluations of Digital Health Interventions for the Management of Musculoskeletal Disorders: Systematic Review and Meta-Analysis." Journal of Medical Internet Research **25**.
7. Wannheden, C., et al. (2022). "Digital Health Technologies Enabling Partnerships in Chronic Care Management: Scoping Review." Journal of Medical Internet Research **24**(8).
8. Angerer, A., et al. (2022). "The Management Perspective in Digital Health Literature: Systematic Review." JMIR mHealth and uHealth **10**(11).

### 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 |
|---|------|------|------|------|------|------|------|------|
| <b>Elective course</b>  |      |      |      |      |      |      |      |      |
| ADPM 654 Digital Health and Innovation for Primary Health Care Management 3 (3-0-6) | R    | P    | P    | P    | I    | I    | R    | M    |
|   |      |      |      |      |      |      |      |      |

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

○ Secondary responsibility

| Course Objectives (CLOs)   | Program learning domains     |     |     |                     |     |                              |     |     |   |     |  |     |     |
|--|------------------------------|-----|-----|---------------------|-----|------------------------------|-----|-----|---|-----|--|-----|-----|
|  | 1.<br>Morality and<br>ethics |     |     | 2.<br>Knowledg<br>e |     | 3.<br>Intellectual<br>skills |     |     | 4.<br>Interperson<br>al Skills<br>and<br>Responsibili<br>ty |     | 5.<br>Numeral Analysis<br>Skills, Communication<br>and<br>Use of Information<br>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 |
| Describe the important of digital health during the disruptive era                                       |                              |     |     | ●                   | ○   | ●                            | ○   |     |   |     |  |     |     |
| Identify the relevant technologies and telecommunication techniques to solve primary health care problem | ●                            | ●   |     | ○                   |     | ○                            |     |     |   |     |  | ●   | ●   |
| Select the appropriate digital health to in different senario  |                              |     |     | ○                   | ○   | ●                            |     | ●   |   |     | ●  |     |     |
| Demonstrate how digital health could enabling data exchange for primary health care                      |                              |     | ●   |                     | ○   |                              |     | ○   | ●   | ●   |  | ●   | ●   |

**Expected Outcome (TOF.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 (CLOs)   | Program Learning Outcomes (PLOs) |      |      |      |      |      |      |      |
|--|----------------------------------|------|------|------|------|------|------|------|
|  | PLO1                             | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 |
| Describe the important of digital health during the disruptive era                                       | √                                |      |      |      |      |      |      |      |
| Identify the relevant technologies and telecommunication techniques to solve primary health care problem |                                  | √    |      | √    |      |      |      | √    |
| Select the appropriate digital health to in different senario  |                                  |      |      |      |      | √    |      | √    |
| Demonstrate how digital health could enabling data exchange for primary health care                      |                                  |      |      |      | √    |      | √    | √    |

### 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.