

SISR 620 (4813) Research Methodology in Biomedicine

(Code : 4813 1st ~2nd year 2units)
(Course ID: GS-c4813-L)

1. Instructors

Name	Position	Department	Contact Information
Cherdsak Iramaneerat	Chief Instructor /Associate Professor Dr.	Division of General Surgery, Department of Surgery	Cherdsak.ira@mahidol.ac.th
Yodying Dangprapai	Instructor	Department of Physiology	Yodying.dan@mahidol.ac.th
Varut Lohsiriwat	Professor Dr.	Division of General Surgery, Department of Surgery	balloon@hotmail.com Varut.loh@mahidol.ac.th
Thasaneeya Nopparatjamjomras	Assistant Professor	Siriraj Health science education excellence center	Thasaneeya.rat@mahidol.ac.th

2. Classroom/Lab Lecture Location

Lecture
Meeting room of the Division of General surgery
Syamindra bld, 12th fl.
Faculty of Medicine Siriraj Hospital
Zoom cloud meeting system
Googole meet system
SelecX system

3. Course Purpose and Outline

General introduction of medical research principles and various research methods used to address research problems in medical services

4. Course objectives

By the end of the course, participants will be able to:

- 1) Describe basic principles of medical research
- 2) Develop proper research questions and hypotheses
- 3) Explain basic principles of research ethics
- 4) Choose appropriate research design to address a research question of interest
- 5) Develop a research proposal

5. Format

Lectures, group discussion, report presentation
All programs will be conducted in English.

6. Course Details

Philosophical foundations of research, research questions, research hypotheses, ethical issues in research, population and sample, validity, research proposal, descriptive study, experimental research, basic science research, case-control study, cohort study, correlational research, survival analysis, survey research, quantitative data analysis, qualitative research, qualitative data collection, qualitative data analysis

Class schedule

NO.	Date	Time	Topic/Details	Instructors
1	Mon, May 17, 2021	16.00 – 18.00	Introduction, Philosophical foundations of research, research questions and hypotheses	Assoc. Prof. Dr. Cherdasak Iramaneerat
2	Wed, May 19, 2021	14.30 - 16.30	Experimental research	Prof. Dr. Varut Lohsiriwat
3	Thurs, May 20, 2021	16.00 -18.00	Research ethics, Research proposal	Assoc. Prof. Dr. Cherdasak Iramaneerat
4	Mon, May 24, 2021	16.00 – 18.00	Population and sample, Internal and external Validity	Assoc. Prof. Dr. Cherdasak Iramaneerat
5	Fri, May 28, 2021	14.30 – 16.30	Case-control study, Cohort study	Prof. Dr. Varut Lohsiriwat
6	Mon, May 31, 2021	16.00 – 18.00	Descriptive research, Quality of life	Assoc. Prof. Dr. Cherdasak Iramaneerat
7	Wed, Jun 9, 2021	14.30 – 16.30	Survival analysis	Prof. Varut Lohsiriwat
8	Thurs, Jun 10, 2021	15.00 – 17.00	Basic science research	Instructor Yodying Dangprapai
9	Mon, Jun 21, 2021	16.00 – 18.00	Correlation research	Assoc. Prof. Dr. Cherdasak Iramaneerat
10	Mon, Jun 28, 2021	16.00 - 18.00	Survey research	Assoc. Prof. Dr. Cherdasak Iramaneerat
11	Mon, Jul 5, 2021	17.00 – 19.00	Quantitative data analysis	Assoc. Prof. Dr. Cherdasak Iramaneerat
12	Mon, Jul 12, 2021	15.00 – 17.00	Qualitative research	Assis. Prof. Thasaneeya Nopparatjamjomras
13	Mon, Jul 19, 2021	16.00 – 18.00	Data collection techniques in qualitative research	Assis. Prof. Thasaneeya Nopparatjamjomras
14	Mon, Aug 2, 2021	15.00 – 17.00	Qualitative data analysis	Assis. Prof. Thasaneeya Nopparatjamjomras
15	Wed, Sep 15, 2021	16.00 – 18.00	Student presentation	Assoc. Prof. Dr. Cherdasak Iramaneerat
16	Wed, Sep 22, 2021	16.00 – 17.00	Examination	Assoc. Prof. Dr. Cherdasak Iramaneerat

All scheduled class will be taught at a meeting room of division of general surgery, Department of Surgery, Syamindra bld. 12th fl., Faculty of Medicine Siriraj Hospital

7. Assessment

Scoring

- | | |
|------------------------|-----------|
| 1. Class participation | 10 points |
| 2. Group discussion | 20 points |
| 3. Report | 40 points |
| - Written report | 20 points |
| - Class presentation | 20 points |
| 4. Examination | 30 points |

Criterion-reference grading

- A = 80 points or more
- B+ = 70 - 79.99 points
- B = 60 - 69.99 points
- C = 50 - 59.99 points
- D = 40 - 49.99 points
- F = 0 - 39.99 points

Class participation

Class participation is evaluated based on punctuality and students' participation in class activities in every class.

Each late attendance will result in a deduction of one point.

Each class absence will result in a deduction of two points.

Late attendance of more than 20 minutes is counted as absence.

Group discussion

In each class, an instructor will observe the discussion. At the end of each class, an instructor will give an ordinal rating of the quantity and quality of discussion of each student (1 = poor, 2= fair, 3= average, 4 = good, and 5 = excellent). The scores obtained from all sessions will be averaged into an individual's discussion score which has a total of 20 points.

Report

Each student writes and presents two reports:

Report 1: Surgical research critical review

Each student conducts a literature search from an online database to find a high quality surgical research published within ten years in an international journal (using English language) and critically reviews the study.

The score of report 1 comes from two sources

1.) Written report 10 points

The written report comprises of two files

a. MS word file: A student's critical review of the study

This report is printed in MS word format using Times New Roman font size 12 points on A4 paper with margins on all sides of 2.5 cm. The report is printed in single space format. The length of this report must not exceed five pages. The report contains the following elements:

- A short summary of the selected research report
- Critical appraisal of the research: Introduction, Methods, Results, Discussion, Conclusion
- How the student search for the study and why the student selects this study for report
- How the student plan to apply the knowledge obtained from the selected study in real life practice

b. PDF file of the published research under review

Both files must be submitted via email to cherdsakiramaneerat@gmail.com at least 3 days prior to oral presentation

2.) Class presentation 10 points

Each student presents their work orally in front of the classroom on Sep 24, 2020.

The content of this presentation covers all four main elements written in the submitted report.

Each student must give oral presentation in 15 minutes. There will be 5 minutes for Q&A after the presentation.

Criteria for evaluation of oral presentation

- Understanding of the research study
- Thoughtful application of the research findings
- Oral presentation skill within time limit
- Proper use of presentation media (PowerPoint)

Report 2: Surgical research proposal

Each student writes a research proposal

The score of report 2 comes from two sources

1.) Written report 10 points

This report is printed in MS Word format using Times New Roman font size 12 points on A4 paper with margins on all sides of 2.5 cm. This report is printed in single space format. The length of this report must not exceed five pages. This report contains the following elements:

- Research title
- Background and short literature review
- Purposes of the study
- Research question
- Population and sample
- Research design
- Research instrument
- Data collection and analysis plan

The report must be submitted via email to cherdsakiramaneerat@gmail.com at least 3 days prior to oral presentation

2.) Class presentation 10 points

Each student presents their work orally in front of the classroom on Sep 24, 2020. The content of this presentation covers all elements written in the submitted report. Each student must give oral presentation in 15 minutes. There will be 5 minutes for Q&A after the presentation.

Criteria for evaluation of oral presentation

- Understanding of the research principles
- Oral presentation skill within time limit
- Proper use of presentation media (PowerPoint)

Examination

A closed book final exam using 60 items of multiple-choice questions (one-best response items)

- Exam date: Wed, Sep 22, 2021
- From 4 – 5 PM
- Total 60 items
- Time 60 min

8. Prerequisite Reading

This course will be taught using four textbooks

Book 1: Bowling A. Research methods in health: Investigating health and health services, 4th ed. Berkshire: McGraw Hill Open University Press; 2014.

Book 2: Ross T. A survival guide for health research methods. Berkshire: McGraw Hill Open University Press; 2012.

Book 3: Morgan GA, Gliner JA, Harmon RJ. Understanding and evaluating research in applied and clinical settings. Mahwah, NJ: Lawrence Erlbaum Associates; 2006.

Book 4: Hammond FM, Malec JF, Nick TG, Buschbacher RM. Handbook for clinical research: Design, statistics, and implementation. New York, NY: Demos medical publishing; 2015.

These four textbooks are available in an eBook format, which can be downloaded from Mahidol University eBook collection.

Session 1: Introduction, Philosophical foundations of research, research questions and hypotheses

Book 1: Chapter 7: The principles of research

Book 3: Chapter 2: Definition, purposes, and dimensions of research

Book 3: Chapter 3: A tale of two paradigms: Quantitative and qualitative

Session 2: Research ethics, research proposal

Book 2: Chapter 8: Ethics in research

Book 3: Chapter 4: Ethical problems and principles in human research

Book 3: Chapter 5: Ethical issues related to publishing and reviewing

Attard N. WASP (Write a scientific paper): Writing an academic research proposal. Early Human Development 2018; 123: 39-41.

Session 3: Population and sample, internal and external validity

Book 1: Chapter 8: Sample size and sampling for quantitative and qualitative research

Book 3: Chapter 17: Internal validity

Book 3: Chapter 18: Sampling and population external validity

Book 3: Chapter 19: Evaluating the validity of a research study: An introduction

Session 4: Descriptive research, Quality of life

Book 1: Chapter 3: Quality of life: concepts, measurements and patient perception

Book 2: Chapter 4: Analysis of quantitative data

Session 5: Experimental research

Book 1: Chapter 10: Quantitative research: experiments and other analytic methods of investigation

Book 3: Chapter 13: Quasi-experimental designs

Book 3: Chapter 14: Randomized experimental designs

Session 6: Basic science research

Kaelin WG. Common pitfalls in preclinical cancer target validation. *Nat Rev Cancer*. 2017 Jul;17(7): 425-440

Session 7: Case-control and cohort study

Book 4: Chapter 5: observational studies: Retrospective versus prospective

Song JW, Chung KC. Observational studies: Cohort and case-control studies. *Plast Reconstr Surg* 2010; 126(6): 2234 – 2242.

Session 8: Correlation research

Book 3: Chapter 26: Basic associational designs: Analysis and interpretation

Book 3: Chapter 30: Use and interpretation of multiple regression

Book 3: Chapter 31: Logistic regression and discriminant analysis: use and interpretation

Session 9: Survival analysis

Book 4: Chapter 40: Kaplan-Meier estimator

Session 10: Survey research

Book 1: Chapter 9: Quantitative research: surveys

Book 1: Chapter 13: Questionnaire design

Session 11: Quantitative data analysis

Book 1: Chapter 15: Preparation of quantitative data for coding and analysis

Book 3: Chapter 23: Selection of inferential statistics: An overview

Book 3: Chapter 24: Single-factor between-groups designs: analysis and interpretation

Book 3: Chapter 25: Single-factor repeated-measures designs: analysis and interpretation

Book 3: Chapter 27: The chi-square test and accompanying effect size indices

Session 12: Qualitative research

Book 2: Chapter 5: Qualitative research

Session 13: Data collection techniques in qualitative research

Book 1: Chapter 16: Unstructured and structured observational studies

Book 1: Chapter 17: Unstructured interviewing

Book 1: Chapter 18: Focus group

Session 14: Qualitative data analysis

Book 2: Chapter 6: Qualitative analysis

Session 15: Student presentation

None

9. Reference Materials

To be announced before individual classes

10. Language used

All classes are conducted in English.

11. Office Hours

Please contact Associate Professor Dr. Cherdsak Iramaneerat
(Cherdsak.ira@mahidol.ac.th)

12. Note(s) to Students

None.