

SISR620 (4813) Research Methodology in Biomedicine

(Code : 4813 1st ~2nd year 2units)

(Course ID: GS-c4813-L)

1. Instructors

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2. Classroom/Lab Lecture Location

- Lecture (Meeting room of the Division of General surgery Syamindra bld, 12th fl.)
- Zoom cloud meeting 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

NO	Topic
1	Introduction, Philosophical foundations of research, research questions and hypotheses
2	Population and sample, Internal and external Validity
3	Experimental research
4	Descriptive research, Quality of life
5	Case-control study, Cohort study
6	Survival analysis
7	Research ethics, Research proposal
8	Survey research
9	Correlation research
10	Basic science research
11	Quantitative data analysis
12	Qualitative research
13	Data collection techniques in qualitative research
14	Qualitative data analysis
15	Student presentation

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 cherdsakiramaneeerat@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

Book1: 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.