

Course syllabus

TMID510 Statistics for Clinical Research

Academic Year 2016-2018

1. **Institute** Mahidol University
Faculty/Department Faculty of Tropical Medicine, Department of Clinical Tropical Medicine
2. **Course Name:**
 - a. **Course Code:** TMID 510
 - b. **Course Title:** Statistics for Clinical Research
3. **Number of credits:** 3 (2-2-5)
4. **Programme use:** Graduate Diploma Programme in Tropical Medicine and Hygiene
Master of Clinical Tropical Medicine
5. **Prerequisite:** None
6. **Type of Course:** Elective subject
7. **Condition: class size:** none
8. **Session/Academics year:** The first semester of each academic year
9. **Course description:**

Statistical methods and their application for clinical research consisting of basic concepts with practical examples from clinical research. Statistical methods for assessing both descriptive statistics and inferential statistics for assessing role of chance or error from sampling. Correlation, linear regression, survival analysis and sample size estimation also included. Practical uses in data entry and analysis of various types of variables using appropriate statistical software packages as well as interpretation of the results and data presentation.

10. Course expected learning outcomes:

- 1) Generalized statistics concept for clinical research
- 2) Perform data entry and data analysis using appropriate statistical software
- 3) Distinguish difference data analysis according type variables and data distribution
- 4) Demonstrate statistical analysis for clinical research with data entry, analysis and interpretation results

10. Course outline and constructive alignment

| Day | Title | Hours | | | Instructor | Course Learning Outcome | Programme ELOs | Learning Activities | Assessment |
|-----|--|---------|-----|------------|---|-------------------------|----------------|--|-----------------------------------|
| | | Lecture | Lab | Self-study | | | | | |
| 1 | Introduction: statistics for clinical researcher | 1 | 0 | 2 | Prof Srivicha | 1 | 5.1 | Seminar, discussion, Q&A | Student participation, Discussion |
| 1 | Descriptive Statistics | 2 | 0 | 4 | Assoc Prof Benjaluck | 2,3 | 5.1 | PowerPoint presentation, Q&A | Student participation, Discussion |
| 2 | Probability and distribution | 1.5 | 0.5 | 3.25 | Assoc Prof Benjaluck | 2,3 | 5.1 | PowerPoint presentation, Practice, Q&A | Student participation, Discussion |
| 2 | Sampling and estimation | 1.5 | 0.5 | 3.25 | Assoc Prof Benjaluck | 2,3 | 5.1 | PowerPoint presentation, Practice, Q&A | Student participation, Discussion |
| 3 | Hypothesis testing | 2 | 0 | 4 | Assoc Prof Benjaluck | 2,3 | 5.1 | PowerPoint presentation, Q&A | Student participation, Discussion |
| 4 | Parametric analysis (1): t-test | 1.5 | 0 | 3 | Asst Prof Apichart | 2,3 | 5.1 | PowerPoint presentation, Q&A | Student participation, Discussion |
| 4 | Parametric analysis (2):ANOVA | 1.5 | 0 | 3 | Dr Borimas | 2,3 | 5.1 | PowerPoint presentation, Q&A | Student participation, Discussion |
| 5 | Data entry, analysis and presentation by Microsoft excel | 0 | 3 | 1.5 | Assoc Prof Kesinee/Asst Prof Apichart/ Assoc Prof Noppadon/Dr Borimas | 2,3 | 5.1 | PowerPoint presentation, Practice, Q&A | Student participation |
| 6 | Nonparametric analysis | 3 | 0 | 6 | Asst Prof Direk/Assoc Prof Kesinee | 2,3 | 5.1 | PowerPoint presentation, Practice, Q&A | Student participation, Discussion |
| 7 | Analysis of Categorical data | 2 | 1 | 4.5 | Assoc Prof Noppadon | 2,3 | 5.1 | PowerPoint presentation, Practice, Q&A | Student participation, Discussion |
| 8 | Correlation and regression | 3 | 0 | 6 | Assoc Prof Noppadon | 2,3 | 5.1 | PowerPoint presentation, Q&A | Student participation, Discussion |
| 9 | SPSS (1) | 0 | 3 | 1.5 | Assoc Prof Noppadon/Asst Prof Apichart/ Assoc Prof Benjaluck/ Assoc Prof Kesinee/Dr Borimas | 2,3 | 5.1 | Practice, Q&A | Student participation, Discussion |
| 10 | SPSS (2) | 0 | 3 | 1.5 | Assoc Prof Noppadon/Asst Prof Apichart/ Assoc Prof Benjaluck/ Assoc Prof Kesinee/Dr Borimas | 2,3 | 5.1 | Practice, Q&A | Student participation, Discussion |

| Day | Title | Hours | | | Instructor | Course Learning Outcome | Programme ELOs | Learning Activities | Assessment |
|-----|---|-----------|-----------|-------------|--|-------------------------|-----------------|--|--|
| | | Lecture | Lab | Self-study | | | | | |
| 11 | Data analysis (1) :Parametric analysis | 0 | 3 | 1.5 | Asst Prof Apichart/Assoc Prof Noppadon/Assoc Prof Benjaluck/ Assoc Prof Kesinee/Dr Borimas | 2,3 | 5.1 | Practice, Q&A | Student participation, Discussion |
| 11 | Data analysis (2): Nonparametric analysis | 0 | 3 | 1.5 | Assoc Prof Noppadon/Assoc Prof Benjaluck/Assoc Prof Kesinee/ Dr Borimas | 2,3 | 5.1 | Practice, Q&A | Student participation, Discussion |
| 12 | Data analysis (3): Analysis of Categorical data | 0 | 3 | 1.5 | Assoc Prof Noppadon/Asst Prof Apichart/Assoc Prof Benjaluck/ Assoc Prof Kesinee/Dr Borimas | 2,3 | 5.1 | Practice, Q&A | Student participation, Discussion |
| 13 | Survival analysis (1) | 2 | 0 | 4 | Asst Prof Wirichada | 2,3 | 5.1 | PowerPoint presentation, Q&A | Student participation, Discussion |
| 13 | Survival analysis (2) | 0 | 3 | 1.5 | Asst Prof Wirichada | 2,3 | 5.1 | Practice, Q&A | Student participation, Discussion |
| 14 | Sample size estimation (1) | 2 | 0 | 4 | Asst Prof Wirichada | 2,3 | 5.1 | PowerPoint presentation, Q&A | Student participation, Discussion |
| 14 | Sample size estimation (2) | 0 | 3 | 1.5 | Asst Prof Wirichada | 2,3 | 5.1 | Practice, Q&A | Student participation, Discussion |
| 15 | Randomization and allocation | 2 | 0 | 4 | Assoc Prof Noppadon | 2,3 | 5.1 | PowerPoint presentation, Q&A | Student participation, Discussion |
| 16 | Meta-analysis | 1 | 0 | 2 | Assoc Prof Noppadon | 1,2,3,4 | 2.2,3.2,3.3,5.1 | PowerPoint presentation, Q&A | Student participation, Discussion |
| 17 | Data presentation (1) | 1 | 0 | 2 | Prof Rungsun | 1,2,3,4 | 2.2,3.2,3.3,5.1 | PowerPoint presentation, Q&A | Student participation, Discussion |
| 18 | Data analysis (4) | 0 | 6 | 3 | Assoc Prof Noppadon/Asst Prof Apichart/Assoc Prof Benjaluck/ Assoc Prof Kesinee/Asst Prof Wirichada/Dr Borimas | 2,3 | 5.1 | Assignment student perform clinical research , data entry , analysis , Q&A | Student participation, Discussion |
| 19 | Data Presentation (2) | 2 | 0 | 4 | Assoc Prof Noppadon/Asst Prof Apichart/Assoc Prof Benjaluck/ Assoc Prof Kesinee/Asst Prof Wirichada | 1,2,3,4 | 2.2,3.2,3.3,5.1 | Assignment presentation as group (3-4 students/group) PowerPoint presentation, Q&A | Student participation Presentation tool and readiness Data analysis and interpretation Discussion |
| | Total | 30 | 30 | 77.5 | | | | | |

11. Teaching and Learning Activities

Lecture in classroom with PowerPoint presentation and practice during class and also in computer room with appropriate statistical software. Exercise by given data files and later students create their own data file and analysis. Statistical analysis and/or statistics part in clinical research paper also demonstrate during class lecture and practice.

12. Teaching media

PowerPoint presentation
 Handouts and textbooks
 Statistical package software
 Publish paper for homework and/or discussion

13. Course achievement and evaluation

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|--------------------------------------|-----|
| Class participation | 20% |
| Discussion | 15% |
| Group activity for data presentation | 15% |
| Group data presentation | 50% |

14. Course evaluation

Discussion and comments session at the end of the course.

15. References

- 1) Douglas GA. Practical statistics for medical research. Chapman and Hall / CRC Texts in Statistical Science, 1991.
- 2) Jacques Esteve, Ellen Benhamou, Luc Raymond. Statistical Methods in Cancer Research. Volume IV. Descriptive Epidemiology IARC Scientific Publications No.128 International Agency for Research on Cancer Lyon 1994
- 3) Everitt BS, Pickles A. Statistical aspects of the design and analysis of clinical trials. London: Imperial College Press; 1999.
- 4) Daly L, Bourke G. Interpretation and uses of medical Statistics 5th ed. 2000.
- 5) Armitage P, Berry G, Matthews JNS. Statistical Methods in Medical Research. 4th ed. 2001.
- 6) Gordis L. Epidemiology. 4th ed. Philadelphia: Saunders Elsevier; 2008.
- 7) Greenhalgh T. How to read a paper: the basics of evidence-based medicine. 5th ed. John Wiley&Sons Ltd; 2014.

16. Instructors:

Prof Srivicha Krudsood
 Prof Rungsunn Tungtrongchitr
 Assoc Prof Benjaluck Phonrat
 Assoc Prof Kesinee Chotivanich
 Asst Prof Apichart Nontprasert

Asst Prof Direk Limmathurotsakul

Assoc Prof Noppadon Tangpukdee

Asst Prof Wirichada Pan-ngum

Dr Borimas Harnkunuprakarn

17. Course responsibility:

Assoc Prof Kesinee Chotivanich

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