

## Announcement on the Course on Research Methodology Offered by Graduate School

Graduate School offers the course on research methodology for PhD and master students in the second semester of year 2022 (starting at Nov, 2022). Those interested in the course please find more information below. Both international and Thai students are welcome to register in the course.

**Course title:** 950-500 research methodology

**Credit:** 1-3 credit, the course consists of 2 modules (see below). Student can select the modules of their interest with the total credit of 1-3.

- 950-500 Research Methodology : 1 (1-0-2) Credit
- 950-500 Research Methodology : 2 (1-2-3) Credit
- 950-500 Research Methodology : 3 (3-0-6) Credit

**Student:** Both international and Thai student are welcome to register to the course. Students from all fields of study (natural sciences, biological sciences, social sciences etc.) could register because course modules cover a wide range of methodology of various fields. Students can select the modules of their interest.

**Language:** courses offered in English

**Perquisite course:** No

**Course coordinator:** Miss Niramon Sulaiman

### Modules:

Module	Credit (s)	Module coordinator
Module 4: Statistics for Research	1	- Assoc. Prof Dr. Apiradee Lim (and team)
Module 5: Experimental Design	2	- Dr.Sasiwimon Iwsakul

Please find more information on the modules from the following pages. For further information, please contact Miss Niramon Sulaiman, E-mail: [niramon.l@psu.ac.th](mailto:niramon.l@psu.ac.th) or Tel 6982

### FAQ:

- No extra tuition fee will be charged for students taking these courses, because the fee is already included in the tuition fee you paid this semester.
- The names of the modules you take will not be appeared in your transcript. The course will appear as “950-500 research methodology” instead.
- Students can register the course for “audit” or “credit”. For those in research only program, please register the course for “audit” (grading is in S or U, satisfied or unsatisfied) during Nov 14 – 27, 2022. URL: <https://sis-hatyai3.psu.ac.th/Default.aspx>
- If you are a student of Pattani Campus, please contact your faculty and registration department of Pattani Campus for registering in these courses (you may need to fill the RF1 general request form before online registration) at; <https://grad.psu.ac.th/en/resources/documents-download.html#graduate-school-forms-gs-forms>

**เค้าโครงรายวิชา (Course Outline)**

**Course title:** 950-500 Research Methodology

**Module 4:** Statistics for Research 1(0-2-1) Credit

**Perquisite course:** No

**Course coordinator:** Assoc. Prof Dr. Apiradee Lim and team

**Office phone& E-mail:** 1890, apiradee.s@psu.ac.th

**Couse objectives:**

After the course, the participants are able:

1. To use the open-source non-commercial R statistical software and epiDisplay package for statistical analyses;
2. To conduct data exploration and cleaning for data management before data analyses;
3. To explain the concept of basic data analyses for continuous and categorical outcomes;
4. To use the appropriate basic statistical analysis for the research and present the relevant research results of the analyses;
5. To apply the appropriate sample size calculation for the research using epiDisplay package in R software and n4Studies mobile application.

**Course description:**

The course covers the use of open-source R statistical software and epiDisplay package for data analysis, introduction to basic statistics of research, data exploration and cleaning, descriptive statistics, hypothesis testing for means and proportions, correlation and linear regression, chi-squared test, odds and odds ratio calculation, confounding and interaction and logistic regression as well as sample size calculation.

## Course outlines:

Date and time (tentative)	Topics	Number of hours			Lecturers
		lecture	practice	Self-study	
Feb 6, 2023 9.00-12.00	- Introduction to statistics - The application of non-commercial statistical program for data analysis <ul style="list-style-type: none"> <li>▪ Introduction to R</li> <li>▪ Data analysis with R</li> </ul>	-	3	6	- Mayuening Eso
Feb 6, 2023 13.00-16.00	Descriptive statistics - Practicing with data exploration, summarization - Data manipulation and data cleaning - Table and graph	-	3	6	- Mayuening Eso
Feb 8, 2023 9.00-12.00	Inferential statistics <ul style="list-style-type: none"> <li>▪ Application the method to research</li> <li>▪ Interpretation of the results</li> </ul> Analysis of variance	-	3	6	- Rhysa McNeil -
Feb 8, 2023 13.00-16.00	- t-test <ul style="list-style-type: none"> <li>▪ Application the method to research</li> <li>▪ Interpretation of the results</li> </ul>	-	3	6	- Rhysa McNeil -
Feb 10, 2023 9.00-12.00	- Chi-square test <ul style="list-style-type: none"> <li>▪ Application the method to research</li> </ul>	-	3	6	- Arinda Ma-a-lee
Feb 10, 2023 13.00-16.00	- Interpretation of the results - Linear regression <ul style="list-style-type: none"> <li>▪ Application the method to research</li> </ul> - Interpretation of the results	-	3	3	- Arinda Ma-a-lee -
Feb 11-12, 2023	Assignment (reading paper and appraisal of statistical analysis with result interpretation)	-	-	9	-
Feb 13, 2023 9.00-12.00	- Odd ratios - Confounding and interaction	-	3	3	- Apiradee Lim -
Feb 13, 2023 13.00-16.00	- Logistic regression <ul style="list-style-type: none"> <li>▪ Application the method to research</li> </ul> - Interpretation of the results	-	3	6	- Apiradee Lim -
Feb15, 2023 9.00-12.00	- Sample size calculation Assignment's discussion	-	3	3	- Nurin Duereh
Feb 15, 2023 13.00-16.00	- Application of the statistical methods with example data - Exercise and quiz	-	3	6	- Nurin Duereh
<b>Total</b>			<b>30</b>	<b>60</b>	

**Venue:** Online via Zoom

**Teaching methods:** Practice 60% of teaching hours  
Demonstration and discussion 40% of teaching hours

**Assessment:** Assignment and quiz 40%  
Class attention and participation 10%  
Examination 50%

Evaluation:	≤ 80.00%	A
	75.00-79.9%	B+
	70.00-74.9%	B
	65.00-69.9%	C+
	60.00-64.9%	C
	55.00-59.9%	D+
	50.00-54.9%	D
	< 50%	E

## Reference

- Agresti A. 2002. *Categorical Data Analysis*. 2002. New York: John Wiley & Sons.
- Chongsuvivatwong, V. 2008. *Analysis of Epidemiological Data Using R and Epicalc*. Epidemiology Unit, Prince of Songkla University..
- Kleinbaum, D.G. 2002. *Logistic Regression: A Self-Learning Text*. New York: Springer-Verlag.
- Maindonald, J. and Braum, W.J. 2010. *Data Analysis and Graphics Using R - An example-Based Approach* Third Edition. New York: Cambridge University Press.
- McNeil, D.R. 2002. *Modern Statistics: A graphical Introduction*. New South Wales: Pearson SprintPrint.
- McNeil. 1996. *Epidemiological Research Methods*. New York: John Wiley.
- Murrell, P. 2005. *R Graphics*. Boca Raton: Chapman & Hall/CRC Press.
- R Core Team. 2016. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. URL <https://www.R-project.org/>.
- Venables, W.N. and Ripley, B.D. 2002. *Modern Applied Statistics with S-PLUS*. Fourth Edition. New York: Springer.

## เค้าโครงรายวิชา (Course Outline)

1. ชื่อ module : module 5 ออกแบบการทดลอง (Experimental Design) จำนวน credit : 2(1-2-3) หน่วยกิต  
หัวข้อที่ศึกษา: Principles of experimental designs; completely randomized designs; sample size determination; randomized complete block designs; factorial designs; multiple comparisons; model checking; computer applications)

2. หัวข้อเนื้อหา จำนวนชั่วโมงที่สอนแต่ละหัวข้อ:

Date and time (tentative)	Topic	Number of hours		
		lecture	practice	Self-study
Nov 29, 2022 Dec 2, 2022	Principles of experimental designs and introduction to R program	1	3	3
Dec 6, 2022 Dec 9, 2022 Dec 13, 2022	Completely randomized designs and sample size determination	2	3	6
Dec 16, 2022 Dec 20, 2022 Dec 23, 2022 Dec 27, 2022	Model checking	2	6	6
Jan 3, 2022 Jan 6, 2022 Jan 10, 2022	Multiple comparisons	2	4	6
to be decided	Midterm Examination			
Jan 13, 2022 Jan 17, 2022 Jan 20, 2022	Randomized complete block designs	2	5	6
Jan 24, 2022 Jan 27, 2022 Jan 31, 2022 Feb 3, 2022 Feb 7, 2022 Feb 17, 2022 Feb 21, 2022 Feb 24, 2022 Feb 28, 2022	Factorial designs	6	10	18
to be decided	Final Examination			

## Remark:

1. The timetable might be adjusted due to any inconvenience.
2. Midterm and final examinations will be informed to the students a week before.

3. กระบวนการจัดการเรียนรู้ของรายวิชาตามหน่วยกิตของภาคทฤษฎี

- |   |                                   |
|---|-----------------------------------|
| 1) การจัดการเรียนการสอนโดยวิธีบรรยาย (lecture)          | ร้อยละ 50 (50% of teaching hours) |
| 2) การฝึกปฏิบัติการวิเคราะห์ข้อมูลตัวอย่าง (Case study) | ร้อยละ 30 (30% of teaching hours) |
| 3) ซักถามและแสดงความคิดเห็นในชั้นเรียน (Discussion)     | ร้อยละ 40 (40% of teaching hours) |
| 4) ทำโจทย์ (Exercise)                                   | ร้อยละ 10 (10% of teaching hours) |

#### 4. วิธีการวัดและประเมินผลของรายวิชา

วิธีการ	ร้อยละ
- สอบกลางภาค (Midterm)	35
- สอบปลายภาค (Final)	35
- การมีส่วนร่วมในชั้นเรียน (Class attention and participation)	10
- รายงานและ/หรือชิ้นงาน (Assignment)	20
<b>รวม</b>	<b>100</b>

#### 5. ชื่ออาจารย์ผู้สอน: ดร.ศศิวิมล อิวสกุล (Dr.Sasiwimon Iwsakul)

#### 6. วัน-เวลา เรียน : เรียนทุกวันอังคาร และ วันศุกร์ เวลา 10.00 – 11.50 น. โดยเริ่มเรียนวันที่ 29 พฤศจิกายน 2565 – 28 กุมภาพันธ์ 2566 ณ ห้อง m211 ตึกคณิตศาสตร์ คณะวิทยาศาสตร์ หรือ ห้องประชุมปณิติตา ชั้น 10 บัณฑิตวิทยาลัย อาคาร LRC หรือ เรียน Online โปรแกรม Zoom

Class will be on every Tuesday and Friday at 10.00 – 11.50 a.m. starting from Dec 29, 2022 to Feb 28, 2023 at m211 room, Mathematic Building, Faculty of Science, or Pundidta room, 10<sup>th</sup> floor, Graduate School, LRC2, PSU Hatyai Campus or online through Zoom applications.

#### 7. เครื่องมือและอุปกรณ์ที่ใช้ประกอบการเรียนการสอน ได้แก่

- 1) คอมพิวเตอร์
- 2) ทีวีโปรเจกเตอร์ (LCD)
- 3) ตำรา และเอกสารประกอบการสอน

#### 8. หนังสือ ตำรา วารสาร และฐานข้อมูลที่ใช้ประกอบการเรียนการสอน ได้แก่

1. Kuehl, R.O. (2000). Design of Experiments: Statistical Principles of Research Design and Analysis, 2nd edition, Duxbury Press.
2. Montgomery, D. C. (2005). Design and Analysis of Experiments, 6th edition. John Wiley & Sons, Inc., New York.
3. R Core Team (2014). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <http://www.R-project.org/>