

Asian Institute of Technology
School of Environment, Resources and Development
Department of Development and Sustainability

ED52.0004 Quantitative Analysis using R **1 (0.5-1.5)** **Semester: Intersem**

Course Objectives:

With increasing needs for research evidence generated through sound quantitative analysis, it is becoming a requirement for students to have basic understanding and practical experience with selected techniques in quantitative analysis. The objective of this course is to equip students with fundamental skills in handling useful analytical techniques, so that they can examine their research questions and hypotheses through these tools while conducting their research. In particular, the course introduces a set of basic regression models, which enable the students to implement analysis of causality from independent variables to a dependent variables. The course emphasizes application rather than theories, and analysis rather than data collection.

Learning Outcomes:

Upon successful completion of this course, students will be able to:

- Select and apply basic but useful and relevant analytical methods for research, using R software; and
- Interpret the output of the analysis in a quantitative manner, while noting the limitations

Pre-requisite:

None

Course Outline:

1. Introduction to R
 1. Basic operations for data handling.
 2. Procedures for generating descriptive and inferential statistics.
2. Quantitative analysis for cross-sectional data.
 1. Review of simple (two-variable) linear regression with the least squares method.
 2. Multiple linear regression with OLS: the concept of ceteris paribus.
 3. Some techniques within OLS: dummy explanatory variables, interaction terms, quadratic terms, and logarithm.
 4. Required conditions for OLS and basic ideas of estimation bias.
 5. Selected models for limited dependent variables: censored and truncation variable (tobit), binary variable (probit, logit, LPM)

Practical Session(s):

Classroom (or online) sessions involve lectures and hands-on exercise with students' own computers. Lectures and practices go hand in hand.

Learning Resources:

Textbooks:

1. Stock, JH and Watson, MW (2017) Introduction to Econometrics, 3rd edition, Addison-Wesley International.
2. Gujarati, D. (1999) Essentials of Econometrics, 2nd edition, McGraw-Hill.

Reference Books:

1. Venables, WN, Smith DM, and the R Core Team (2017) Introduction to R: Notes on R: A Programming Environment for Data Analysis and Graphics. Manual for R version 3.4.3. R, Foundation for Statistical Computing. <https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf>
2. Wooldridge, JM (2003) Introductory Econometrics: A Modern Approach. 2nd edition, South-Western College Publishing.
3. Kennedy, P (1998) A Guide to Econometrics. 4th edition, Blackwell.

Journals and Magazines:

1. International Journal of Social Research Methodology (Taylor & Francis)
2. The R Journal (The R Foundation)

Others:

None

Teaching and Learning Methods:

Lectures and practices in the classroom (or virtual classroom). Selected quantitative techniques will be illustrated by using Open-Access R software.

Time Distribution and Study Load:

Lecture: 10 hours

Practices with own computers in classroom (or virtual classroom): 15 hours

Self-study: 30 hours

Evaluation Scheme:

The term paper carries 90% of the weight, while participation carries 10% of the weight. There will be no exam. Class attendance will not be taken. Grade “A” would be awarded if a student demonstrates excellent understanding on topics covered in the course. Grade “B” would be awarded if a student shows an overall understanding of topics covered in the course. Grade “C” would be given if a student meets below average expectations on both understanding and application. Grade “D” would be given if a student does not meet basic expectations in analyzing or understanding issues covered in the course.

Instructor:

Takuji W Tsusaka