RES310　Analysis of Quantitative Data

1st and 2nd quarters, Junior

Instructor	INOUE HIROYUKI
Style of Class	Lecture
Number of Credits	2
Day and Period	To be advised

Course Description

Aggregation and analysis of data acquired through surveys and research is essential in order to comprehend and solve local problems. This class aims to impart knowledge in the statistical analysis of aggregated data using such tools as Excel, SPSS, and R. Students are provided with a number of simulation tasks based on concrete cases focusing on business information such as financial data, and solve these tasks using statistical software. Through these tasks, they acquire basic statistical literacy and fundamental skills of data analysis for exploring and solving local problems. The type of statistical processing dealt with in this class is multivariate analysis, centering on simple regression analysis, multiple regression analysis, and quantification theory types 1 and 2.

Course Objectives

Students will be able to conduct analysis of and derive certain findings from assigned data using methods of multivariate analysis, centering on multiple regression analysis and quantification theory types 1 and 2.

Prerequisites

Data Science I

Class Materials

Materials distributed to students taking the class

Course Method

Students will firstly be provided with data and simulation tasks. The tasks will be undertaken in class time, with classes operated in a manner that leads students toward envisaged conclusions, followed finally by commentary on the theoretical significance of the tasks.

Evaluation/Assessment

Grades will be determined by reference to each student's solutions to the assigned tasks in reports on each simulation task (total 80%) and in the final examination (20%).

Grading

80%　Submitted reports
20%　Final examination

Course Schedule

Week 1: Orientation

Explanation of Class aims and format; the importance of data analysis and statistical processing in addressing local problems

Week 2: Spreadsheet software (basic operations in Excel) / basic operations in statistical software

How to use statistical software used in this Class: Excel, SPSS, and R

Week 3: Cross-tabulation 1 (fundamentals of cross-tabulation of data using spreadsheet software)

Methods of cross-tabulation using Excel, in order to master methods of data collection as an antecedent to statistical processing

Week 4: Cross-tabulation 2 (applications of cross-tabulation of data in spreadsheet software)

Methods of cross-tabulation using Excel based on actual data

Week 5: Regression analysis (simple regression analysis in spreadsheet software)

Methods of simple regression analysis using Excel based on actual data

Week 6: Multiple regression analysis 1 (fundamentals of multiple regression analysis in spreadsheet software)

Methods of multiple regression analysis using Excel based on actual data

Week 7: Multiple regression analysis 2 (applications of multiple/simple regression analysis in spreadsheet software and multicollinearity)

Problems of multicollinearity in multiple regression analysis using Excel based on actual data

Week 8: Multiple regression analysis 3 (multiple/simple regression analysis of time series data in spreadsheet software)

Methods of multiple/simple regression analysis of time series data using Excel based on actual data

Week 9: Discriminant analysis 1 (fundamentals of discriminant analysis in spreadsheet software)

Methods of discriminant analysis using Excel based on actual data

Week 10: Discriminant analysis 2 (applications of discriminant analysis in spreadsheet software)

Methods of discriminant analysis using Excel based on actual data

Week 11: Type I quantification theory 1 (fundamentals of type I quantification theory in spreadsheet software)

Methods of type I quantification theory using Excel based on actual data

Week 12: Type I quantification theory 2 (applications of type I quantification theory in spreadsheet software)

Methods of type I quantification theory using Excel based on actual data

Week 13: Type II quantification theory 1 (fundamentals of type II quantification theory in spreadsheet software)

Methods of type II quantification theory using Excel based on actual data

Week 14: Type II quantification theory 2 (applications of type II quantification theory in spreadsheet software)

Methods of type II quantification theory using Excel based on actual data

Week 15: Wrap-up

Recap of cases studied in previous classes to facilitate thorough understanding

Preparation and Follow-up

Preparation: Research the keywords indicated in the content of each class. Read through the materials distributed in advance.

Follow-up: Revise class content and repeat exercises using data handled in class and related data. Complete any problems that were set during class.