PIA8621: QUANTITATIVE METHODS

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Quantitative Methods

Subject Code
PIA - Public and International Affairs
Course Number
8621

Academic Unit
Public and International Affairs (PIA)

College/School
College of Liberal Arts and Social Sciences (CH)

Course Duration
One Semester

Credit Units
3

Level
R8 - Research Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
POL8621 Quantitative Methods

Exclusive Courses
Nil

Part II Course Details

Abstract
This course introduces doctoral students to basic statistical concepts using real-world examples and hands-on data manipulation. Within this course, students will learn about the practical uses of statistics in social science, public policy,

management, and everyday life. The course explores topics such as multiple regression, logistic regression, factor analysis, and structural equation modelling, with a particular focus on understanding the conditions under which various statistical techniques may be properly used. Since virtually all of the computations are done with computers, a portion of class time will be devoted to becoming familiar with statistical packages such as STATA. At the end of this course, students will 1) be able to interpret statistical findings of various kinds, 2) become a qualified "consumer" of statistics presented in scholarly journals, and 3) prepare themselves for future research projects with a quantitative component.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Demonstrate a good understanding of major quantitative techniques often used in social science research		x	x	
2	Become familiar with statistical software		x	x	
3	Interpret quantitative results to lay readers in academic writing			x	x
4	Analyze and assess the validity and reliability of statistical data discussed in articles, reports and newspapers		x	x	x
5	Apply analytic skills learned in the class to solving real problems in social science research				x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Student are expected to participate in structured seminar with software practice	Structured seminars/ computing sessions with statistical software practice and instruction	1, 2, 3	
2	Student are expected to conduct necessary readings and prepare materials for discussions and software sessions before each class	Preparation of materials for discussion in seminars/ computing lab sessions	1, 3, 4	
3	Students are expected to have individual consultation and inquiry together with teachers	Individual consultation and inquiry together with teachers	2, 3, 5	

4	Students are required to complete an individual project based on the quantitative skills covered in this course and then present the project in front of other students for feedback and suggestions	Student can either conduct an individual research project with learned quantitative method, or replicate an existing quantitative research published in a top journal. They are required to conduct a conference-style presentation in front of other students and teachers,	1, 2, 3, 4, 5	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Problem Sets	1, 2, 3, 4, 5	30	-	No
2	Individual Project Paper	1, 2, 3, 4, 5	30	-	No
3	Attendance and Participation	1, 2, 3	10	-	No
4	Final Test	1, 2, 3, 4, 5	30	-	No

Continuous Assessment (%)

100

Examination (%)

0

Assessment Rubrics (AR)

Assessment Task

1. Problem Sets (30%) (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

Excellent

(A+, A, A-) Excellent ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

Good

(B+, B, B-) Good ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

Fair

(C+, C, C-) Basic ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

Marginal

(D) Poor ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

Failure

(F) Inadequate ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

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Assessment Task

2. Individual Project and Presentation (30%) (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to apply what has been learned for an independent research project or assessing the advantages and shortcomings of an existing quantitative research.

Excellent

(A+, A, A-) Excellent demonstration of knowledge, understanding, and interpretation of quantitative methods

Good

(B+, B, B-) Good demonstration of knowledge, understanding, and interpretation of quantitative methods

Fair

(C+, C, C-) Basic demonstration of knowledge, understanding, and interpretation of quantitative methods

Marginal

(D) Poor demonstration of knowledge, understanding, and interpretation of quantitative methods

Failure

(F) Inadequate demonstration of knowledge, understanding, and interpretation of quantitative methods

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Assessment Task

3. Final Test (30%) (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Levels of understanding of materials covered during all thirteen weeks of the course

Excellent

(A+, A, A-) An excellent level of understanding of materials covered during all thirteen weeks of the course

Good

(B+, B, B-) A good level of understanding of materials covered during all thirteen weeks of the course

Fair

(C+, C, C-) A basic level of understanding of materials covered during all thirteen weeks of the course

Marginal

(D) A poor level of understanding of materials covered during all thirteen weeks of the course

Failure

(F) An inadequate level of understanding of materials covered during all thirteen weeks of the course

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Assessment Task

4. Attendance and Participation (10%) (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Attend all classes and participate activiely in class discussions

Excellent

(A+, A, A-) Attend all classes with very active class participation

Good

(B+, B, B-) Miss less than 3 classe without reasons, and have active class participation

Fair

(C+, C, C-) Miss up to three classes without reason, and have satisfactory class participation

Marginal

(D) Miss up to 4 classes without reasons, and have few class participation

Failure

(F) Miss more than 4 classes without reasons, and almost have no class participation

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Assessment Task

1. Problem Sets (30%) (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

Excellent

(A+, A, A-) Excellent ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

Good

(B+, B) Good ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

Marginal

(B-, C+, C) Basic ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

Failure

(F) Inadequate ability to apply what has been learned over the semester to analyse or address issues in real-world scenarios

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Assessment Task

2. Individual Project (30 %) (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Ability to apply what has been learned for an independent research project or assessing the advantages and shortcomings of an existing quantitative research.

Excellent

(A+, A, A-) Excellent demonstration of knowledge, understanding, and interpretation of quantitative methods

Good

(B+, B) Good demonstration of knowledge, understanding, and interpretation of quantitative methods

Marginal

(B-, C+, C) Basic demonstration of knowledge, understanding, and interpretation of quantitative methods

Failure
(F) Inadequate demonstration of knowledge, understanding, and interpretation of quantitative methods

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Assessment Task
3. Final Test (30%) (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Levels of understanding of materials covered during all thirteen weeks of the course

Excellent
(A+, A, A-) An excellent level of understanding of materials covered during all thirteen weeks of the course

Good
(B+, B) A good level of understanding of materials covered during all thirteen weeks of the course

Marginal
(B-, C+, C) A basic level of understanding of materials covered during all thirteen weeks of the course

Failure
(F) An inadequate level of understanding of materials covered during all thirteen weeks of the course

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Assessment Task
4. Attendance and Participation (10%) (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Attend all classes and participate activiely in class discussions

Excellent
(A+, A, A-) Attend all classes with very active class participation

Good
(B+, B) Miss less than 3 classe without reasons, and have active class participation

Marginal
(B-, C+, C) Miss up to three classes without reason, and have satisfactory class participation

Failure
(F) Miss more than 4 classes without reasons, and almost have no class participation

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Part III Other Information

Keyword Syllabus
Measures of Central Tendency; Measures of Variation; the Chi-Square Distribution; Hypotheses Testing; Analysis of Covariance; Linear Regression; MLE; Causal Inference; Panel Data

Reading List

Compulsory Readings

	Title
1	Angrist, Joshua D., and Jörn-Steffen Pischke. Mostly harmless econometrics: An empiricist's companion. Princeton university press, 2008.
2	Wooldridge, Jeffrey M. Introductory econometrics: A modern approach. Cengage learning, 2015.
3	Gujarati, D. 2012. Econometrics by Example, McGraw-Hill Education

Additional Readings

	Title
1	Babbie, Earl R. 2010. The Practice of Social Research. Belmont, Calif: Wadsworth Cengage.
2	Wang, Xiaohu, 2010, Performance Analysis for Public and Nonprofit Organizations. Jones and Bartlett Publishers
3	Berry, W. D. (1993). Understanding Regression Assumptions: Series Quantitative Applications in the Social Sciences. Thousand Oaks.
4	Imai, Kosuke, Quantitative Social Science: An Introduction,