

Course Title	Research Methods 2: Data Analysis	Instructor(s)	Tunn Cho Lwin
		E-mail	tlwin@miu.ac.jp
Class Style	Lectures, Guided hands-on practice, and Discussion	Office Hours	Tuesday 9:05 – 10:30 Appointments are also available by e-mail.
Track	Liberal Arts	Mode of Instruction	Face-to-face
Credits	2	Allocated Year	2026 Fall Semester
Active Learning	1-(3) Written Paraphrases and Summaries 2-(3) Presentations 4-(11) Oral Peer Review of Written Work	Compulsory or Elective	Elective
Course Overview	This course introduces students to the fundamental concepts and methods of data analysis used in research. Students will learn how to apply basic statistical methods, including z-scores, hypothesis testing, t-tests, and analysis of variance (ANOVA), to analyze and interpret research data. Microsoft Excel will be used throughout the course for statistical calculations, data analysis, and presentation of results. The course emphasizes understanding statistical results and drawing appropriate conclusions rather than focusing only on mathematical calculations.		
Course Objectives	By the end of this course, students will be able to: - understand fundamental concepts of statistical analysis and statistical inference in research. - calculate and interpret z-scores and other basic statistical measures. - formulate and evaluate hypotheses using statistical significance and p-values. - apply appropriate statistical methods, including independent-samples t-tests, paired-samples t-tests, and one-way ANOVA. - use Microsoft Excel to conduct basic statistical analyses and organize and present results. - interpret statistical results and distinguish between statistical significance and practical significance. - select appropriate statistical methods based on research questions and types of data. - communicate data analysis results clearly using tables, charts, and written explanations.		
Prerequisite	None		
Course Schedule	No	Contents	Homework
	1	Introduction to Data Analysis and Excel - Introduction to data analysis and inferential statistics - Basic Excel functions for statistical analysis	Confirm access to Moodle and Microsoft Excel, and make sure both are ready for use in this course.
	2	Standard Scores and Z-Scores - Understanding standard scores and relative position - Calculating and interpreting z-scores	Prepare for the next lecture.
	3	Sampling and Statistical Inference - Understanding populations, samples, and sampling variation - Introduction to statistical inference	Quiz 1
	4	Hypothesis Testing and Statistical Significance - Understanding null and alternative hypotheses - Understanding p-values and statistical significance	Prepare for the next lecture.
	5	Comparison of Two Groups - Understanding differences between two groups	Quiz 2

		- Comparing group means and variation	
	6	Independent-Samples t-Test - Understanding when to use an independent-samples t-test - Conducting and interpreting results in Excel	Assignment 1
	7	Paired-Samples t-Test - Understanding comparisons between related observations - Interpreting differences before and after an intervention	Midterm Practice Questions: Complete the practice questions provided for review. Prepare for the midterm examination.
	8	Midterm Examination - Midterm examination covering Lectures 1–7	Prepare for the next lecture.
	9	Introduction to Analysis of Variance (ANOVA) - Understanding the purpose of ANOVA - Understanding between-group and within-group variation	Prepare for the next lecture.
	10	One-Way ANOVA - Understanding ANOVA results - Conducting a one-way ANOVA in Excel	Quiz 3
	11	Interpreting ANOVA Results - Understanding significant and non-significant differences - Comparing groups after ANOVA	Prepare for the next lecture.
	12	Effect Size and Practical Significance - Understanding the magnitude of research findings - Distinguishing statistical significance from practical significance	Prepare for the next lecture.
	13	Interpreting and Evaluating Research Evidence - Drawing appropriate conclusions from statistical results - Understanding limitations and generalization	Assignment 2
	14	Selecting Appropriate Statistical Methods - Matching research questions with appropriate analysis methods - Reviewing z-scores, t-tests, and ANOVA	Quiz 4
	15	Presenting Data Analysis Results - Preparing tables, charts, and statistical summaries - Writing clear interpretations and conclusions	Final Practice Questions: Complete the practice questions provided for review. Prepare for the final examination.
		Final Examination - Comprehensive; 25% from Lectures 1–7 and 75% from Lectures 9–15.	
Grading	<u>Assessment</u> Quiz 1 – 5 % Quiz 2 – 5% Quiz 3 – 5% Quiz 4 – 5% Assignment 1 – 10% Assignment 2 – 10% Midterm Examination – 25% Final Examination – 35%		

	Notes 1. Quizzes and Assignments: Four quizzes and two assignments will be conducted during the semester. Quizzes and assignments must be submitted through Moodle. For each assignment, a sample dataset will be provided, and students will use Microsoft Excel for data analysis and presentation of results. Students will also prepare a short report based on the assigned dataset. 2. Midterm Examination: The Midterm Examination covers Lectures 1–7. 3. Final Examination: The Final Examination is comprehensive and covers the course material from Lectures 1–7 and 9–15. Twenty-five percent of the examination covers Lectures 1–7, and seventy-five percent covers Lectures 9–15. 4. Late Submissions: Late submissions will be subject to a penalty. Late quizzes and assignments must be submitted by e-mail and will be accepted only until the next scheduled examination. After that point, late submissions will NOT be accepted. 5. Missed Examinations: Students who miss an examination must inform the instructor as soon as possible and provide appropriate documentation or evidence. A make-up examination may be required in accordance with university regulations. 6. Grades: Assignment and quiz grades will normally be updated on Moodle within five days after grading is completed. Students are responsible for checking their grades regularly. 7. Academic Integrity: Plagiarism and other forms of academic misconduct are strictly prohibited. Appropriate references must be included whenever external sources are used in an assignment.
Textbooks	No required textbook. Handouts and instructor-prepared materials will be provided and used in class.
References	1. Ott, R. L., & Longnecker, M. (2016). An introduction to statistical methods & data analysis (7th ed.). Cengage Learning. 2. Cooper, H. (2017). Research synthesis and meta-analysis: A step-by-step approach (5th ed.). SAGE Publications.
NOTES	1. Attendance: Regular attendance and punctuality are required. Arriving more than 20 minutes late or leaving more than 20 minutes early will be recorded as an absence. Three late arrivals or early departures will count as one absence. An overall attendance rate below 66% will result in automatic failure, in accordance with university regulations. 2. Missed Classes: Students are responsible for obtaining the class materials, resources, and information for any classes they miss. Students should check Moodle and contact the instructor when necessary. 3. Learning Support: Students are encouraged to ask questions, seek clarification, and contact the instructor when they need help with the course. 4. Excel and Course Materials: Microsoft Excel will be used regularly for data analysis and presentation of results. Students are responsible for having access to Microsoft Excel and the required course materials throughout the semester. 5. Questions and Concerns: Questions or concerns regarding grades, quizzes, assignments, or course procedures should be raised during the course period. Requests submitted after the course period has ended may not be considered.