

Course Code	HP 2100
Course Title	Research Design and Data Analysis in Psychology
Pre-requisites	1. HP1000 Introduction to Psychology 2. HP1100 Fundamentals of Social Science Research, or CS2008 Fundamentals of Research
No of AUs	3 AUs

Course Aims

Building upon on the basic statistics concepts introduced in HP 1100, this course will discuss analysis of experimental data from simple and factorial designs using analysis of variance (ANOVA). Elementary concepts of multiple regression and test of association in categorical data will also be introduced. The course is divided into lectures and tutorials. Lectures focus on conceptual issues and cover the content materials that need to understand in order to work with empirical data. Tutorials provide hands-on experience with data analysis using SPSS.

Intended Learning Outcomes (ILO)

By the end of this course, you should be able to:

- 1) describe different experimental design (between-subjects, within-subjects, factorial , Latin square, successive treatment, inter-mixed, split plot);
- 2) explain and conduct the variance decomposition principle underlying Analysis of Variance (ANOVA) for testing systematic (treatment) effect;
- 3) explain and conduct simple and multiple regression for describing and testing linear relationship between an outcome and explanatory variables.
- 4) explain and conduct how to test association between two categorical variables;
- 5) perform ANOVA, regression and test association between categorical variables analysis by hand calculation and through SPSS;
- 6) draw valid conclusions from the results of statistical analysis.

Course Content

This course is to teach students the statistical principles underlying ANOVA and regression methods for data analysis. First part of the course covers on how to perform Analysis of Variance (ANOVA) for one-way between-subjects, two-way between-subjects and one-way repeated measures design. Second part of the course covers model comparison approach for testing hypothesis in regression. The last part of the course provides an introduction to analysis of categorical data (test for association).

Assessment (includes both continuous and summative assessment)

Component	ILO Tested	Related Programme LO or Graduate Attributes	Weighting	Team/Individual
1. Final Exam	1, 2, 3, 4, 5, 6	Competence Communication Creativity	40%	Individual
2. Quizzes	1, 2, 3, 4, 5, 6	Competence Communication	25%	Individual
3. Group Project	1, 2,3, 4, 5, 6	Competence Communication Character Creativity	35%	Team/Individual
Total			100%	

Formative feedback

Feedback is central to this course. Students will receive feedbacks from the course instructor about their quizzes, and assignments. For group project, students can arrange consultation with instructors to discuss their ideas. Feedback will be provided to them on the data analysis plan so to ensure students on the right track.

Learning and Teaching approach

Approach	How does this approach support students in achieving the learning outcomes?
Lecture	This approach supports students in achieving the learning outcomes by introducing students to the key concepts in the course. [ILO: 1,2,3,4,5,6]
Tutorial	In smaller groups, students gain practical experience analyzing data using Statistical Package for the Social Sciences (SPSS), a common statistical software that psychologists use for data analysis. [ILO: 5,6]

Reading and References

Recommended References

- [GW] Gravetter, F. J., & Wallnau, L. B. (2017). *Statistics for the Behavioral sciences (10th Edition)*. Belmont, CA: Thomson Wadsworth. (Ebook available through NTU library)
- [MW] McBurney, D., & White, T.L. (2017). *Research methods (9th ed.)*. Wadsworth Publishing
- [Keith] Keith, T. Z. (2006). *Multiple regression and beyond*. Pearson/Allyn & Bacon

Course Policies and Student Responsibilities

Students are expected to complete all assigned class readings and activities, attend classes punctually and complete all scheduled assignments and quiz by due dates. Students are expected to take responsibility to follow up with course notes, assignments, and course related announcements for classes they have missed. Participation is expected in all discussions and activities. No make-up quiz

or extension will be given without a signed letter from a doctor or head of a university-sponsored extra-curricular program documenting illness. All missed quizzes and assignments will have a zero grade. As Psychology students, the guidelines of the American Psychological Association on referencing and citation are expected to be followed (see APA Publication Manual, 7th Edition).

Academic Integrity

Originality of work and appropriate acknowledgement of reference source are extremely important in the academic context. See here for the details:

<https://ntulearn.ntu.edu.sg/bbcswwebdav/courses/AI0001-Master/m/index.htm>

As a psychology student, you are expected to follow the guidelines of the American Psychological Association on referencing and citation (see APA Publication Manual, 7th Edition).

As a student of NTU, you are expected to uphold the Honor Code against plagiarism and collusion. Plagiarism and collusion are defined as the following in the Honor Code:

Plagiarism: "To use or pass off as one's own, the writings or ideas of another, without acknowledging or crediting the source from which the ideas are taken."

Collusion: "Submitting an assignment, project or report completed by another person and passing it off as one's own; Preparing an assignment, project or report for a fellow student who submits the work as his or her own."

Committing plagiarism and/or collusion in this course warrants serious penalty, see here for more details

<http://www.sss.ntu.edu.sg/Programmes/Undergraduate/CurrentStudents/Pages/Plagiarism.aspx>

Planned Weekly Schedule

Week	Topic	Course LO	Readings/ Activities
1	Introduction to Analysis of Variance (ANOVA)	1,2	MW Ch 10
2	One-way ANOVA – Hypothesis testing	2,5,6	GW Ch 12
3	One-way ANOVA – Post-hoc comparisons	2,5,6	GW Ch 12
4	Basic concepts of factorial design and introduction to Two-way ANOVA	1,2	MW 11
5	Two-way ANOVA – Hypothesis testing	2,5,6	GW 14
6	Introduction to one-way repeated measures ANOVA	1,2	GW 13
7	Midterm	Nil	Nil
8	Review of Simple Regression	2,5,6	GW 16, Keith Ch 2
9	Multiple Regression: Basics and statistical inferences	3,5,6	GW 16, Keith Ch 2

10	Multiple regression: categorical Predictors	3,5,6	Keith Ch 6
11	Multiple regression: Interaction effect between categorical and continuous Predictors	3,5,6	Keith Ch 6
12	Test of Association for categorical variables	4,5,6	GW 17
13	Revision	1,2,3,4,5,6	Nil