

Course Code	HP3101
Course Title	Applied Statistical Methods for Psychological Research
Pre-requisites	HP1000 Introduction to Psychology & HP1100 Fundamentals of Social Science Research & HP2100 Research Design & Data Analysis in Psychology OR CS2008 Fundamentals of Research & HP1000 Introduction to Psychology & HP2100 Research Design & Data Analysis in Psychology
No of AUs	3

Course Aims

This is an intermediate level course in statistics for psychological research. The general focus of the course will be on advanced topics in analysis of variance (higher-order between-subjects design, repeated-measures design, split-plot design, Latin-square design, cross-over design, etc.) and regression analysis (polynomial regression, moderation analysis, and residual analysis).

Intended Learning Outcomes (ILO)

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

- 1) describe and apply the principles for searching of best models and most useful predictors and test for moderation in regression;
- 2) describe and apply the principles of ANOVA for analyzing complex design discussed in the course;
- 3) evaluate statistical assumptions of ANOVA and regression through residual analysis;
- 4) conduct analysis discussed in the course using software package such as SPSS and/or R;
- 5) draw valid conclusions from the results of statistical analysis.

Course Content

This course is to enable students to apply ANOVA and regression methods to social sciences data, with proper attention to underlying statistical assumptions, and a key emphasis on the practical interpretation and communication of results. The first part of the courses covers advanced topics in regression including searching for best models (forward selection/backward elimination/stepwise) and most useful predictors (dominance analysis), test for moderation effect, and residual analysis. Second part of the course covers advanced topics in ANOVA, including contrast analysis, analysis for split plot design and cross-over design.

Assessment (includes both continuous and summative assessment)

Component	ILO Tested	Related Programme LO or Graduate Attributes	Weighting	Team/ Individual
CA1. Assignment	1, 2, 3, 4, 5	Cognitive Agility, Character and Competence	30%	Individual
CA2. Quiz 1	1, 2, 3, 4, 5	Cognitive Agility, Character and Competence	15%	Individual

CA3. Quiz 2	1, 2, 3, 4, 5	Cognitive Agility, Character and Competence	15%	Individual
CA4. Group Project	1, 2,3, 4, 5	Cognitive Agility, Character and Competence	40%	Team (with peer review)
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: 1,2,3,5]
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: 1,2,4,5]

Reading and References

[AW] Aiken, L.S. & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage Publications

[JMR] Judd, C.M., McClelland, G.H., & Ryan, C.S. (2009). *Data Analysis: A Model Comparison Approach* (2 ed.). Routledge

[KTZ] Keith, T. Z. (2006). *Multiple regression and beyond*. Allyn & Bacon/Pearson.

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/bbcswebdav/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	Review on Multiple regression Model comparison approach	4,5	JMR Ch. 2, 3, 4
2	Automated Model Building Procedures	1,3,4,5	KTZ Ch. 5
3	Interaction effects: Among continuous variables)	1,3,4,5	KTZ Ch. 7
4	Interaction effects II : Test for simple slope, and curvilinear regression	1,3,4,5	KTZ Ch. 8, 9
5	Determining the Importance of Predictors (Dominance Analysis)	1,3,4,5	Reference will be provided in NTU Learn
6	Model diagnostics	3,4,5	KTZ Ch. 10
7	One-way ANOVA : Contrast analysis	2,3,4,5	JMR Ch. 8
8	Two-way Factorial between-subjects ANOVA (Simple effects and Contrast analysis)	2,3,4,5	JMR Ch. 9
9	Analysis of Covariance	2,3,4,5	JMR Ch. 10

10	Repeated measures ANOVA : post hoc contrasts and two way repeated measure design	2,3,4,5	JMR Ch. 11
11	ANOVA for Cross-over Design	2,3,4,5	Reference will be provided in NTU Learn
12	ANOVA for Split-plot	2,3,4,5	Reference will be provided in NTU Learn
13	Revision	1,2,3,4,5	Nil