# Course Code
# Applied Data Analytics
# Module 2, 2025-2026

## Course Information

***Instructor: Zhuo Chen***
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Office Hour: 13:30-15:00 (Mon.), 13:30 – 15:00 (Thur.)

***Teaching Assistant:***
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***Classes:***
Lectures: Mon. & Thur., 15:30-17:20
Venue: PHBS Building, TBC

***Course Website:***
If any.

## 1. Course Description

### *1.1 Context*

Course overview: Data is regarded as the new currency in the 21st Century. This course aims to help students use appropriate research methods and data science techniques to answer research questions and solve real-world problems. Going beyond theory, students will learn how to analyze data collected through experiments, surveys, and digital traces. Students will also learn how to clean, prepare, and analyze data using R studio. This course will include applied approaches such as Moderation & Mediation, Structural Equation Modelling, and various statistical learning techniques. This course will cover these approaches in the context of Communication Research: Social Media, Marketing Communication, and other business decisions. Upon completion of this course, R studio will become your best partner in data analytics.

Prerequisites: No.

### *1.2 Textbooks and Reading Materials*

Field, A. P., Miles, J., & Field, Z. (2012). *Discovering statistics using R*. Sage.

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). *An introduction to statistical learning: with applications in R* (Vol. 103). New York: springer.

Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (Second edition)*. New York: Guilford Press.

Salganik, M. J. (2019). *Bit by bit: Social research in the digital age*. Princeton University Press.

## 2. Learning Outcomes

### *2.1 Intended Learning Outcomes*

| **Learning Goals** | **Objectives** | **Assessment (YES with details or NO)** |
|---|---|---|
| 1. Our graduates will be effective communicators. | 1.1. Our students will produce quality business and research-oriented documents. | Yes, students are required to produce a final report. |
| | 1.2. Students are able to professionally present their ideas and also logically explain and defend their argument. | Yes, students are expected to actively participate in the class discussion and present their group project. |
| 2. Our graduates will be skilled in team work and leadership. | 2.1. Students will be able to lead and participate in group for projects, discussion, and presentation. | Yes, students will participate in group discussion. |
| | 2.2. Students will be able to apply leadership theories and related skills. | Yes, with insight into business and media data. |
| 3. Our graduates will be trained in ethics. | 3.1. In a case setting, students will use appropriate techniques to analyze business problems and identify the ethical aspects, provide a solution and defend it. | Yes, particularly using quantitative analysis techniques. |
| | 3.2. Our students will practice ethics in the duration of the program. | Yes. |
| 4. Our graduates will have a global perspective. | 4.1. Students will have an international exposure. | Yes, will include cases around the globe. |
| 5. Our graduates will be skilled in problem-solving and critical thinking. | 5.1. Our students will have a good understanding of fundamental theories in their fields. | Yes. |
| | 5.2. Our students will be prepared to face problems in various business settings and find solutions. | Yes. |
| | 5.3. Our students will demonstrate competency in critical thinking. | Yes. |

### *2.2 Course specific objectives*

Upon successful completion of this course, students will be able to:

1. Master appropriate practices such as experimental and survey design to tackle a research question.
2. Apply proper data science techniques to the research question.
3. Deploy advanced algorithms to make predictions and improve decision making.
4. Write R-scripts.

### *2.3 Assessment/Grading Details*

| Subject | Percent of Grade |
|---|---|

| | |
|---|---|
| Attendance and participation | 15% |
| Group project | 45% |
| Assignments | 40% |

### *2.4 Academic Honesty and Plagiarism*

It is important for a student's effort and credit to be recognized through class assessment. Credits earned for a student work due to efforts done by others are clearly unfair. Deliberate dishonesty is considered academic misconducts, which include plagiarism; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis.

All assessments are subject to academic misconduct check. Misconduct check may include reproducing the assessment, providing a copy to another member of faculty, and/or communicate a copy of this assignment to the PHBS Discipline Committee. A suspected plagiarized document/assignment submitted to a plagiarism checking service may be kept in its database for future reference purpose.

Where violation is suspected, penalties will be implemented. The penalties for academic misconduct may include: deduction of honour points, a mark of zero on the assessment, a fail grade for the whole course, and reference of the matter to the Peking University Registrar.

AI tools requirements：
Using AI tools to complete assignments or assessments without the approval of the course instructor will be regarded as an act of academic dishonesty. Depending on the severity of the situation, penalties will be implemented in accordance with the provisions of the Peking University Graduate Student Handbook.

For more information of plagiarism, please refer to *PHBS Student Handbook*.

## 3. Topics, Teaching and Assessment Schedule

| Date | Topic | Recommended reading |
|---|---|---|
| Nov.13 | Introduction to applied data analytics | |
| Nov.17 | Basic statistics | Chapter 2 [Discovering statistics using R] |
| Nov.20 | Experimental Design | Chapter 4 [Bit by Bit] |
| Nov.24 | Analysis of Experiment Data I: t-Test & ANOVA | Chapter 9 [Discovering statistics using R] |
| Nov.27 | Analysis of Experiment Data II: Moderation & Mediation Analysis I | Chapter 3&7 [Introduction to mediation, moderation, and conditional process analysis] |
| Dec.1 | Analysis of Experiment Data III: Moderation & Mediation Analysis II | Chapter 3&7 [Introduction to mediation, moderation, and conditional process analysis] |
| Dec.4 | Survey Methodology | Chapter 3 [Bit by Bit] |
| Dec.8 | Analysis of Survey Data I: Correlation & Regression | Chapter 7 [Discovering statistics using R] |
| Dec.11 | Mid-term proposal | |
| Dec.15 | Analysis of Survey Data II: SEM I (CFA) | Articles |
| Dec.18 | Analysis of Survey Data III: SEM II | Articles |

| | | |
|---|---|---|
| | (Multigroup Analysis) | |
| Dec.24 | Analysis of Survey Data IV: SEM III (Latent Growth Modeling) | Articles |
| Dec.25 | Digital traces data I: Network data | Chapter 2 [Bit by Bit] |
| Dec.29 | Digital traces data II: Textual data | |
| Dec.31 | Introduction to Statistical Learning I | Chapter 2 [An Introduction to Statistical Learning] |
| Jan.5 | Introduction to Statistical Learning II | Chapter 4 [An Introduction to Statistical Learning] |
| Jan.8 | Data processing | |
| Jan.12 | Recap & Poster Session | |

*Note: Classes on Dec.22 will be moved to Dec.24&classes on Jan.1, 2026 will be moved to Dec.31, 2025

## 4. Miscellaneous

The syllabus is subject to change with prior notice to students either in class or via email.