

Syllabus

SURV 750 Step by Step in Survey Weighting 1 credit/2 ECTS

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Video lecture by Richard Valliant

September 03 – September 24, 2021

Short Course Description

This course is a statistical methods class combining hands-on applications and general review of the theory for survey weighting.

Course Objectives

By the end of the course, students will...

- Role of survey weights in population inference.
- Steps in weighting, including computation of base weights, nonresponse adjustments, and uses of auxiliary data.
- Nonresponse adjustment alternatives, including weighting cell adjustments, formation of cells using classification algorithms, and propensity score adjustments.
- Weighting via poststratification, raking, general regression estimation, and other types of calibration.
- Assessing if weights are not needed.

Prerequisites

Sampling theory, Applied sampling (e.g., SURV626 Sampling I, or SURV747 Practical Tools (Part I) for Sampling).

Some experience with variance estimation (e.g., SURV742 Inference from Complex Surveys), statistical analysis using survey data, and the R statistical computing software will be helpful.

Class Structure and Course Concept

This is an online course, using a flipped classroom design. It covers the same material and content as an on-site course but runs differently. In this course, you are responsible for watching video-recorded lectures and reading the required literature for each unit prior to participating in mandatory weekly one-hour online meetings where students have the chance to discuss the materials from a unit with the instructor. Just like in an on-site course, homework will be assigned and graded and there will be a final exam at the end of the course.

Although this is an online course where students have more freedom in when they engage with the course materials, students are expected to spend the same amount of time overall on all activities in the course – including preparatory activities (readings, studying), in-class-activities (watching videos, participating in online meetings), and follow-up activities (working on assignments and exams) – as in an on-site course. As a rule of thumb, you can expect to spend approximately 3h/week on in-class-activities and 9 hours per week on out-of-class activities (preparing for class, readings, assignments, projects, studying for quizzes and exams). Therefore, the workload in all courses will be approximately 12h/week. This is a 1-credit/2-ECTS course that runs for 4 weeks. Please note that the actual workload will depend on your personal knowledge.

Mandatory Weekly Online Meetings

Friday, 7:00-7:50 AM EDT/1:00-1:50 PM CEST, starting September 3

Meetings will be held online through Zoom. Follow the link to the meeting sessions on the course website on mannheim.instructure.com. If video participation via Internet is not possible, arrangements can be made for students to dial in and join the meetings via telephone.

In preparation for the weekly online meetings, students are expected to watch the lecture videos and read the assigned literature before the start of the meeting. In addition, students are encouraged to post questions about the materials covered in the videos and readings of the week in the forum before the meetings (deadline for posting questions is: one day before the online meeting on Thursday at 7:00 AM EDT/1:00 PM CEST).

Students have the opportunity to use the BigBlueButton feature in Canvas to connect with peers outside the scheduled weekly online meetings (e.g., for study groups). Students are not required to use BigBlueButton and can of course use other online meeting platforms such as Google Hangouts, Skype or Microsoft Teams.

Grading

Grading will be based on:

- 4 Homework assignments (50% of grade)
- A take-home final exam (30% of grade)
- Class Participation (20% of grade) in discussion during the weekly online meetings and posting questions to the weekly discussion forum (deadline: 24 hours before class) demonstrating understanding of the required readings and video lectures

A+ 100 - 97
A 96 - 93
A- 92 - 90
B+ 89 - 87
B 86 - 83
B- 82 - 80
Etc.

The grading scale is a base scale recommended by the IPSDS. Variations for grading on a scale are at the discretion of the instructor.

Dates of when assignment will be due are indicated in the syllabus. There are penalties for turning in homework after the due dates:

1 day late: 25% off
2 days late: 50% off
3+ days late: no credit

Technical Equipment Needs

The learning experience in this course will mainly rely on the online interaction between the students and the instructors during the weekly online meetings. Therefore, we encourage all students in this course to use a web camera and a headset. Decent quality headsets and web cams are available for less than \$20 each. We ask students to refrain from using built-in web cams and speakers on their desktops or laptops. We know from our experience in previous online courses that this will reduce the quality of video and audio transmission and therefore will decrease the overall learning experience for all students in the course. In addition, we suggest that students use a wire connection (LAN), if available, when connecting to the online meetings. Wireless connections (WLAN) are usually less stable and might be dropped.

Long Course Description

This course and the textbook give students the necessary tools to calculate analysis weights for various survey designs in a real-world setting. We will cover topics on calculating base weights for single- and multistage designs, adjusting weights for unknown study eligibility and nonresponse using a few techniques, and aligning survey estimates with known population values through weight calibration.

We will use specialized software for the procedures mentioned. This course will emphasize R but some examples in SAS and Stata are also discussed. R is downloaded for free from <http://cran.r-project.org/>. Students may also find <https://www.rstudio.com/> a helpful interface to execute program code. For those new to R, there are many MarinStatsLectures available at <https://www.youtube.com/playlist?list=PLqzoL9-eJTNBDdKgJgJzaQcY6OXmsXAHU>

There will be homework problems each week for students to gain practice using all methods covered in the course. The emphasis will be on using the methods to solve practical problems; we review theory as needed for a clear understanding of the underlying assumptions. All are encouraged to discuss their own weighting challenges and solutions during our weekly online meetings.

Readings

Primary Readings

Valliant, R., Dever, J.A., and Kreuter, F. (2018). Practical Tools for Designing and Weighting Survey Samples, 2nd Edition. New York: Springer.

Required and Recommended Readings

List of required and recommended readings for each class are provided below for each specific unit.

Please note that the recorded lectures are provided as a supplement to and not a substitution for the course readings.

Academic Conduct

Clear definitions of the forms of academic misconduct, including cheating and plagiarism, as well as information about disciplinary sanctions for academic misconduct may be found at

<https://www.president.umd.edu/sites/president.umd.edu/files/documents/policies/III-100A.pdf> (University of Maryland) and

<https://www.uni-mannheim.de/en/research/good-research-practice/> (University of Mannheim).

Knowledge of these rules is the responsibility of the student and ignorance of them does not excuse misconduct. The student is expected to be familiar with these guidelines before submitting any written work or taking any exams in this course. Lack of familiarity with these rules in no way constitutes an excuse for acts of misconduct. Charges of plagiarism and other forms of academic misconduct will be dealt with very seriously and may result in oral or written reprimands, a lower or failing grade on the assignment, a lower or failing grade for the course, suspension, and/or, in some cases, expulsion from the university.

Accommodations for Students with Disabilities

In order to receive services, students at the University of Maryland must contact the Accessibility & Disability Service (ADS) office to register in person for services. Please call the office to set up an appointment to register with an ADS counselor. Contact the ADS office at 301.314.7682; <https://www.counseling.umd.edu/ads/>.

Students at the University of Mannheim should contact the Commissioner and Counsellor for Disabled Students and Students with Chronic Illnesses at http://www.uni-mannheim.de/studienbueros/english/counselling/disabled_persons_and_persons_with_chronic_illnesses/

Course Evaluation

In an effort to improve the learning experience for students in our online courses, students will be invited to participate in an online course evaluation at the end of the course (in addition to the standard university evaluation survey). Participation is entirely voluntary and highly appreciated.

Sessions

Week 1: Basic Steps in Weighting

Video lecture: available: Friday, August 27, 2021

Online meeting: Friday, September 3, 7:00 AM EDT/1:00 PM CEST

Homework 1: due Monday, September 6, 12:00 PM EDT/6:00 PM CEST

Required Readings:

Textbook; Chapter 6; Sections 13.1 – 13.5.2

Week 2: Basic Steps in Weighting (continued)

Video lecture: available Friday, September 3, 2021

Online meeting: Friday, September 10, 7:00 AM EDT/1:00 PM CEST

Homework 2: due Monday, September 13, 12:00 PM EDT/6:00 PM CEST

Required Readings:

Textbook; Chapter 6; Sections 13.5.3 – 13.8

Week 3: Calibration and Other Uses of Auxiliary Data in Weighting

Video lecture: available Friday, September 10, 2021

Online meeting: Friday, September 17, 7:00 AM EDT/1:00 PM CEST

Homework 3: due Monday, September 20, 12:00 PM EDT/6:00 PM CEST

Required Readings:

Textbook; Chapter 6; Sections 14.1 – 14.3

Week 4: Calibration (continued) and Replicate Weights

Video lecture: available online Friday, September 17, 2021

Online meeting: Friday, September 24, 7:00 AM EDT/1:00 PM CEST

Homework 4: due Monday, September 27, 12:00 PM EDT/6:00 PM CEST

Required Readings:

Textbook; Chapter 6; Sections 14.4 – 14.5 & Section 15.4 (review 15.1 – 15.3, if needed)

Final Exam

Due: Friday, October 1, 12:00 PM EDT/6:00 PM CET