

Stat 440 Topics Linked to Thompson & Lohr Texts

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Term, Time & Location: Fall 2025, TuTh 12:30-1:45pm, CHE2136

Texts: (1) (Required) Steven Thompson (2012), *Sampling Statistics*, 3rd ed.

(2) (Recommended) Sharon Lohr (2010), *Sampling: Design and Analysis*, 2nd or 3rd ed.

Course Coverage: Thompson Chap. 1–8, 10–13, plus Lohr Chap. 8 and part of 9, 11.

Topics

- I. Basic concepts: sample design, bias, sampling & nonsampling errors, simulation
Thompson Ch. 1, Sec. 2.1–2.4, 2.8, Lohr Ch. 1, Sec. 2.1–2.4
- II. Simple random sampling: statistics, estimates, confidence intervals
Thompson Sec. 2.4, 2.6, Ch. 3, Ch. 4, Sec. 5.1–5.2 Lohr Sec. 2.3, 2.5, 2.6, 2.8–2.10
- III. Poisson, Probability Proportional to Size With Replacement (PPSWR), and Systematic Sampling Designs
Thompson Sec. 2.5, 12.3, 12.4, Ch. 6, Lohr Sec. 2.1, 2.7, 5.5, 6.5, 6.6
- IV. Stratified sampling, optimal (Neyman) allocation of stratum samples
Thompson Ch. 11, Lohr Ch. 3
- VI. Relation between design- and model-based estimators
Thompson Sec. 1.5, 2.7, 7.6, 8.5, Ch. 10, Lohr 2.9, 3.6, 4.6, 5.6, 6.7
- VII. Ratio and regression estimators *Thompson Ch. 7, 8, Lohr Ch. 4*
- VIII. Cluster sampling & hierarchical survey designs *Thompson Ch. 12, 13, Lohr Ch. 7*
- IX. Nonresponse and Survey Weights: ratio adjustments, Raking and Calibration
Thompson Sec. 14.5, Lohr Ch. 8
- X. Variance estimation; model-assisted parameter estimation in superpopulations
Lohr Ch. 9, plus hints of Ch. 11