BIOST 540
LONGITUDINAL AND MULTILEVEL DATA ANALYSIS
Course Outline

TOPIC (estimated number of lectures) READING

1. Introduction to longitudinal and clustered data (2)
DHLZ: Ch. 1
FLW: Chs. 1, 2

2. Continuous response data (4)
Models and EDA for means   DHLZ: Chs. 3, 4, 5
Models and EDA for covariance   FLW: Chs. 3, 4, 5, 6, 7, 8
Estimation and inference (GEE)
Mixed model formulation

3. Binary and count data (4)
Group-by-time analysis   DHLZ: Chs. 7, 8, 9, 10
GEE   FLW: Chs. 10, 11, 12, 13
Generalized linear mixed models
Transition models

4. Missing data (2)
Types of missing data   DHLZ: Ch. 13
Analysis with mixed models   FLW: Ch. 14
Multiple imputation
Weighted estimation

5. Time-dependent covariates (2)
Covariate lags   DHLZ: Ch. 12
Endogenous covariates
Marginal structural models

6. Multi-level models (4)
Formulation of the model   FLW: Ch. 17
Ecological analysis
Variance components / heterogeneity

Meta-analysis

7. **Design considerations** (1)
    Sample size and power   DHLZ: Ch. 2