Generalized Estimating Equations (GEE) Training Course

Professional Development Training Course Outline

Category	Research and Data Analysis	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Generalized Estimating Equations (GEE) Training Course is a specialized, in-depth training designed for data analysts, researchers, biostatisticians, and professionals in fields such as epidemiology, public health, and social sciences. GEEs are a robust statistical method used to analyze correlated data—especially longitudinal and clustered data—offering significant advantages over traditional linear models. This comprehensive course equips participants with the knowledge and skills needed to apply GEE in real-world datasets using modern software tools like R, SAS, and Stata.

With the growing emphasis on data-driven decisions, this course provides hands-on training in statistical modeling, repeated measures analysis, and advanced data interpretation using GEE. Participants will master the application of GEE across various sectors including healthcare, environmental science, behavioral research, and economics. Through a blend of theoretical instruction, practical coding exercises, and real-world case studies, learners will gain the confidence to design and execute GEE analyses and communicate statistical findings effectively

Programme Curriculum

Generalized Estimating Equations (GEE) Training Course

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Course Objectives

1. Understand the theoretical foundation of Generalized Estimating Equations.
2. Apply GEE models to longitudinal and clustered data.
3. Identify appropriate working correlation structures.
4. Interpret GEE output from statistical software (R, SAS, Stata).
5. Compare GEE with Generalized Linear Mixed Models (GLMMs).
6. Handle missing data in repeated measures using GEE.
7. Conduct model diagnostics and assess goodness-of-fit.
8. Implement GEE in real-world research settings.
9. Analyze binary, count, and continuous outcome variables.
10. Visualize results for publication and reporting.
11. Integrate GEE with data preprocessing and cleaning workflows.
12. Utilize GEE in multi-level or hierarchical data environments.
13. Build reproducible GEE analysis pipelines using scripts.

Target Audience

1. Public health professionals and epidemiologists
2. Biostatisticians and data scientists
3. Clinical research analysts
4. Social science researchers
5. Environmental and agricultural statisticians
6. Health informatics professionals
7. Graduate students in quantitative fields
8. Policy analysts working with longitudinal data

Course Duration: 5 days

Course Modules

Module 1: Foundations of GEE

- Introduction to longitudinal and correlated data
- Overview of traditional vs GEE approaches
- Core statistical assumptions of GEE
- Explanation of working correlation structures
- Use cases of GEE in applied research
- **Case Study:** GEE application in hospital readmission data

Module 2: Model Building with GEE

- Formulating research questions using GEE
- Selection of link and variance functions
- Building models with repeated measures
- Modeling interactions and covariates
- Handling continuous and categorical predictors
- **Case Study:** GEE for behavioral risk factor surveillance

Module 3: Implementing GEE in R

- Introduction to R packages for GEE (e.g., geepack)
- Data formatting for GEE analysis
- Running GEE models in R step-by-step
- Extracting and interpreting model output
- Visualization of GEE results
- **Case Study:** GEE analysis using clinical trial data in R

Module 4: GEE in SAS and Stata

- Syntax and procedures for GEE in SAS (PROC GENMOD)
- Executing GEE in Stata using xtgee
- Comparison of software output
- Exporting results for reporting
- Troubleshooting common software errors
- **Case Study:** Multi-platform analysis of diabetes progression

Module 5: Working Correlation Structures

- Types: Independence, Exchangeable, AR(1), Unstructured
- Choosing the correct structure for your data
- Effects on model efficiency and inference
- Simulations to compare structures
- Model selection criteria (QIC)
- **Case Study:** Choosing optimal correlation for child growth data

Module 6: Missing Data and Diagnostics

- Overview of missing data mechanisms
- Strategies to handle missingness in GEE
- Diagnostic plots and residual analysis
- Checking model fit and influence diagnostics
- Assessing model robustness
- **Case Study:** Missing data in mental health surveys

Module 7: Advanced Topics in GEE

- Marginal vs subject-specific modeling
- Extension to multi-level GEE models
- GEE2 and robust variance estimators
- Addressing time-varying covariates
- Introduction to penalized GEE
- **Case Study:** Multi-center study on cardiovascular risk

Module 8: Capstone Project and Application

- Review of core concepts and techniques
- Designing a GEE-based analysis from scratch
- Data collection, cleaning, and preparation
- Model specification and refinement
- Final presentation of project findings
- **Case Study:** GEE applied to national health policy dataset

Training Methodology

- Instructor-led lectures with interactive Q&A sessions

- Hands-on coding labs using R, SAS, and Stata
- Group discussions and peer review
- Real-world datasets and simulation exercises
- Downloadable course materials and video recordings
- Final capstone project with instructor feedback

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com