Survival Analysis / Event History Techniques Training Course

Professional Development Training Course Outline

Category	Demography and Population Studies	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Survival Analysis and Event History Techniques have become essential in understanding time-to-event data across healthcare, finance, engineering, and social sciences. Survival Analysis Event History Techniques Training Course provides a comprehensive exploration of statistical methods and modeling strategies designed to analyze the timing, frequency, and occurrence of events. Participants will gain hands-on expertise in advanced survival models, hazard functions, censored data handling, and time-dependent covariates, enhancing their ability to make data-driven decisions. With the integration of trending machine learning approaches and predictive analytics, this training equips professionals with the skills to uncover insights from complex longitudinal datasets efficiently.

This training course emphasizes practical applications, case studies, and real-world examples to bridge the gap between theoretical concepts and actionable outcomes. Participants will develop competencies in software tools like R, Python, and SAS for survival modeling, ensuring robust and reproducible analyses. By the end of the course, attendees will be prepared to tackle organizational challenges related to customer churn, patient survival, equipment reliability, and social event dynamics. This course is designed for analysts, researchers, and decision-makers aiming to leverage survival analysis for strategic planning and predictive modeling.

Programme Curriculum

Survival Analysis Event History Techniques Training Course

Introduction

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Course Objectives

1. Understand the principles and assumptions of survival analysis and event history modeling.
2. Analyze censored and truncated data effectively using advanced statistical techniques.
3. Apply Kaplan-Meier estimation and log-rank tests for comparing survival distributions.
4. Build and interpret Cox proportional hazards models for predictive insights.
5. Integrate time-dependent covariates into survival and event history models.
6. Implement parametric survival models including exponential, Weibull, and Gompertz distributions.
7. Conduct competing risks analysis and multi-state modeling.
8. Utilize R, Python, and SAS for advanced survival modeling.
9. Interpret hazard functions, survival functions, and cumulative incidence rates accurately.
10. Employ machine learning techniques to enhance predictive modeling of event history data.
11. Perform model diagnostics and validation to ensure reliability of results.
12. Design data collection strategies for longitudinal and time-to-event studies.
13. Translate survival analysis findings into actionable organizational insights.

Organizational Benefits

- Improved decision-making through predictive event modeling.
- Enhanced risk assessment and resource allocation.
- Increased accuracy in forecasting patient outcomes or customer behavior.
- Data-driven strategies for operational efficiency and policy planning.
- Reduced uncertainty in long-term planning through event history insights.
- Enhanced ability to handle censored and missing data in analyses.
- Improved reporting and visualization of survival data.
- Strengthened competitive advantage using predictive insights.
- Better integration of statistical and machine learning methods.
- Enhanced workforce analytical capabilities and skill development.

Target Audiences

1. Data analysts and statisticians

2. Healthcare researchers and epidemiologists
3. Actuarial scientists and financial analysts
4. Market researchers and customer insights professionals
5. Operations managers and risk analysts
6. Policy analysts and social scientists
7. Academic researchers and graduate students
8. Software engineers and data scientists working with longitudinal datasets

Course Duration: 10 days

Course Modules

Module 1: Introduction to Survival Analysis

- Definition and scope of survival analysis
- Key terminologies: event, survival time, censoring
- Types of censoring and truncation
- Overview of applications in healthcare, finance, and social sciences
- Case Study: Patient survival analysis in oncology
- Practical exercise in R and Python

Module 2: Kaplan-Meier Estimation

- Estimating survival functions
- Plotting survival curves
- Handling censored data
- Comparison between groups using log-rank tests
- Software implementation in R and SAS
- Case Study: Customer churn analysis

Module 3: Cox Proportional Hazards Model

- Model assumptions and hazard function
- Estimation of coefficients and hazard ratios
- Interpretation of model outputs
- Assessing proportional hazards assumption
- Model diagnostics and validation
- Case Study: Risk factors in cardiovascular disease

Module 4: Parametric Survival Models

- Exponential, Weibull, Gompertz distributions
- Maximum likelihood estimation

- Model selection criteria
- Comparison with semi-parametric methods
- Practical implementation in Python
- Case Study: Equipment reliability in manufacturing

Module 5: Time-Dependent Covariates

- Incorporating time-varying predictors
- Extended Cox models
- Practical examples in R
- Model interpretation and hazards
- Handling multiple time-dependent covariates
- Case Study: Longitudinal study of patient treatment

Module 6: Competing Risks and Multi-State Models

- Understanding competing risks
- Estimation of cause-specific hazards
- Multi-state model framework
- Applications in epidemiology and finance
- Software implementation
- Case Study: Hospital readmission analysis

Module 7: Model Diagnostics and Validation

- Residual analysis
- Goodness-of-fit tests
- Checking proportional hazards assumption
- Model calibration
- Cross-validation techniques
- Case Study: Predictive model validation in healthcare

Module 8: Machine Learning in Survival Analysis

- Random survival forests
- Gradient boosting survival models
- Integration with Cox models
- Handling high-dimensional data
- Performance metrics
- Case Study: Predicting customer lifetime value

Module 9: Data Preparation for Survival Analysis

- Cleaning and formatting longitudinal data
- Handling missing and censored observations
- Creating time-to-event datasets
- Data transformation techniques
- Exploratory data analysis
- Case Study: Employee attrition study

Module 10: Software Tools for Survival Analysis

- Overview of R packages: survival, survminer
- Python libraries: lifelines, scikit-survival
- SAS procedures: PROC LIFETEST, PROC PHREG
- Integrating software workflows
- Visualizations for survival data
- Case Study: Drug efficacy analysis

Module 11: Advanced Topics in Event History Analysis

- Frailty models
- Recurrent event analysis
- Joint modeling of longitudinal and survival data
- Applications in clinical trials
- Software implementation strategies
- Case Study: Chronic disease progression

Module 12: Interpretation and Reporting

- Translating statistical outputs into actionable insights
- Reporting survival analysis results
- Graphical presentations
- Communicating findings to stakeholders
- Ethical considerations
- Case Study: Public health intervention reporting

Module 13: Longitudinal Study Design

- Principles of time-to-event study design
- Sample size and power calculations
- Randomized vs observational studies
- Handling dropouts and censoring
- Regulatory and ethical considerations

- Case Study: Multi-center clinical trial

Module 14: Strategic Applications Across Industries

- Healthcare predictive analytics
- Financial risk and insurance modeling
- Customer retention and marketing analytics
- Manufacturing and engineering reliability
- Policy and social research applications
- Case Study: Insurance claim risk prediction

Module 15: Capstone Project and Case Studies

- Comprehensive project integrating all modules
- Data collection and preparation
- Model building and evaluation
- Interpretation and reporting
- Presentation to peers and instructors
- Case Study: End-to-end patient survival analysis

Training Methodology

- Interactive lectures and concept discussions
- Hands-on exercises with R, Python, and SAS
- Case studies from healthcare, finance, and social sciences
- Real-world project assignments and capstone projects
- Group discussions and peer learning sessions
- Continuous assessments and feedback loops

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	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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