Survival Analysis with Competing Risks 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

Survival analysis has become a cornerstone in data-driven decision-making across medical research, public health, clinical trials, and actuarial sciences. As real-world events often involve multiple causes of failure or event types, understanding competing risks is essential. Survival Analysis with Competing Risks Training Course is designed to empower professionals with the advanced statistical and computational tools necessary to handle time-to-event data with multiple risk factors. By integrating competing risks models, cumulative incidence functions, and cause-specific hazard modeling, learners will gain practical, research-backed techniques to interpret and visualize complex survival data effectively.

With a strong emphasis on data analysis using R and Python, this course covers theoretical foundations and hands-on case studies from oncology, epidemiology, insurance, and engineering. Participants will also explore risk stratification, proportional hazards modeling, and machine learning integration for survival data. Designed for data scientists, epidemiologists, and researchers, this training blends statistical theory with real-world application, enhancing both analytical skills and domain-specific knowledge.

Programme Curriculum

Survival Analysis with Competing Risks Training Course

Introduction

Survival analysis has become a cornerstone in data-driven decision-making across medical research, public health, clinical trials, and actuarial sciences. As real-world events often involve multiple causes of failure or event types, understanding competing risks is essential. Survival Analysis with Competing Risks Training Course is designed to empower professionals with the advanced statistical and computational tools necessary to handle time-to-event data with multiple risk factors. By integrating competing risks models, cumulative incidence functions, and cause-specific hazard modeling,

learners will gain practical, research-backed techniques to interpret and visualize complex survival data effectively.

With a strong emphasis on data analysis using R and Python, this course covers theoretical foundations and hands-on case studies from oncology, epidemiology, insurance, and engineering. Participants will also explore risk stratification, proportional hazards modeling, and machine learning integration for survival data. Designed for data scientists, epidemiologists, and researchers, this training blends statistical theory with real-world application, enhancing both analytical skills and domain-specific knowledge.

Course Objectives

By the end of this course, participants will be able to:

1. Define and differentiate standard survival analysis and competing risks models.
2. Apply Kaplan-Meier and cumulative incidence estimators using R/Python.
3. Interpret cause-specific hazard and subdistribution hazard models.
4. Analyze real-world datasets with multiple failure types.
5. Visualize time-to-event data and cumulative incidence functions.
6. Fit and validate Fine and Gray models for competing risks.
7. Evaluate model performance using concordance indices and calibration.
8. Integrate machine learning for advanced survival prediction.
9. Develop robust survival models for clinical and public health settings.
10. Apply survival analysis in actuarial science and reliability engineering.
11. Handle missing data and censoring in time-to-event datasets.
12. Build dashboards and reports for survival outcomes communication.
13. Interpret and present statistical outcomes to non-technical stakeholders.

Target Audience

1. Epidemiologists and public health analysts
2. Biostatisticians and clinical researchers
3. Data scientists in healthcare and pharma
4. Actuarial analysts and insurance professionals
5. Biomedical and reliability engineers
6. Graduate students in biostatistics or data science
7. Medical research fellows and clinicians
8. Government and NGO program evaluators

Course Duration: 5 days

Course Modules

Module 1: Foundations of Survival Analysis

- Introduction to survival analysis and censoring
- Kaplan-Meier estimator basics
- Time-to-event data structure and formats
- Right censoring vs. left truncation
- Real-world medical dataset analysis
- **Case Study: Cancer patient survival in a clinical trial**

Module 2: Understanding Competing Risks

- Definition and concepts of competing risks

- Cumulative incidence vs. Kaplan-Meier
- Identifying cause-specific events
- Limitations of standard methods
- Coding competing risks in R
- **Case Study: Kidney transplant failure causes**

Module 3: Cause-Specific Hazard Models

- Cause-specific vs. subdistribution hazards
- Time-dependent covariates inclusion
- Assumption checking and validation
- Hazard ratio interpretation
- Model building in R using survival package
- **Case Study: Heart disease vs. cancer mortality**

Module 4: Subdistribution Hazard Models (Fine & Gray)

- Overview of Fine and Gray model
- Comparison with cause-specific models
- Model fitting using cmprsk and riskRegression
- Advanced model diagnostics
- Interpretation of covariate effects
- **Case Study: Competing causes of ICU discharge**

Module 5: Visualization and Interpretation

- Cumulative incidence function plots
- Risk tables and forest plots
- Interpretation for clinical decision-making
- Graphs using ggsurvplot and ggplot2
- Interactive dashboards with Shiny and Plotly
- **Case Study: Stroke vs. bleeding risk in patients**

Module 6: Advanced Topics and Machine Learning

- Random survival forests and DeepSurv
- Comparison with classical models
- Model tuning and evaluation metrics
- Use of scikit-survival and lifelines in Python
- Integration with real-time clinical decision systems
- **Case Study: Predicting readmission in COVID-19**

Module 7: Real-World Applications

- Health economics and policy planning
- Actuarial science applications
- Engineering and manufacturing reliability
- Designing public health interventions
- Translating findings to recommendations
- **Case Study: Insurance claim predictions by event type**

Module 8: Ethical and Practical Considerations

- Data privacy and informed consent
- Responsible reporting of results
- Bias and confounding in survival models

- Communicating uncertainty
- Policy implications and stakeholder engagement
- **Case Study: Ethics in oncology survival studies**

Training Methodology

- Instructor-led lectures and live demos
- Interactive coding labs in R and Python
- Real-world datasets for practice
- Peer-to-peer discussion and Q&A forums
- Downloadable templates, scripts, and resources
- Access to recorded sessions and technical support

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

Start Date	End Date	Location	Price
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
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