Use of Crash Prediction Models in Project Design Training Course

Professional Development Training Course Outline

Category	Traffic Management & Road Safety	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The integration of Crash Prediction Models (CPMs) in infrastructure project design has revolutionized the approach to road safety management, risk mitigation, and data-driven decision-making. By leveraging predictive analytics, engineers and planners can proactively identify potential collision hotspots, optimize geometric design, and implement countermeasures before construction, significantly reducing road fatalities and traffic-related injuries. Use of Crash Prediction Models in Project Design Training Course equips participants with the latest methodologies, tools, and case studies to apply CPMs effectively in the planning, design, and operational stages of transportation projects.

Designed for professionals in transportation engineering, road safety, and project management, this course emphasizes practical application of statistical crash prediction models, simulation-based analysis, and evidence-based safety interventions. Participants will gain hands-on experience in model selection, calibration, and validation, ensuring that projects are aligned with global safety standards and sustainable infrastructure practices. By the end of the program, attendees will be capable of implementing predictive safety solutions that enhance traffic performance, reduce accident severity, and support smart mobility initiatives.

Programme Curriculum

Use of Crash Prediction Models in Project Design Training Course

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5 days

Course Objectives

1. Understand the fundamentals of Crash Prediction Models (CPMs) and their role in road safety engineering.
2. Identify high-risk locations using historical crash data and predictive analytics.
3. Apply statistical and machine learning models for collision prediction in project design.
4. Integrate CPMs into geometric and operational design decisions.
5. Evaluate the effectiveness of road safety interventions using predictive modeling.
6. Develop skills in model calibration and validation for local traffic conditions.
7. Utilize GIS and traffic simulation tools for safety performance assessment.
8. Analyze case studies to identify best practices in crash reduction.
9. Apply risk-based prioritization in transportation planning projects.
10. Understand policy and regulatory frameworks influencing CPM application.
11. Enhance project decision-making through data-driven insights.
12. Foster collaboration between engineers, planners, and safety analysts.
13. Promote adoption of innovative technologies in predictive road safety management.

Target Audience

1. Transportation Engineers
2. Road Safety Professionals
3. Urban Planners
4. Highway Designers
5. Traffic Analysts
6. Policy Makers in Transport Safety
7. Project Managers in Infrastructure
8. Data Scientists specializing in Traffic Safety

Course Modules

Module 1: Introduction to Crash Prediction Models

- Overview of CPMs and their importance in road safety
- Types of CPMs
- traffic volume, geometric characteristics, and historical crash data

- Understanding model outputs and interpretation
- Case Study: Highway safety evaluation using CPMs

Module 2: Data Collection and Preparation

- Sources of crash and traffic data
- Data cleaning and quality control for predictive modeling
- Geospatial data integration in CPMs
- Handling **missing data and outliers**
- Case Study: **Urban intersection crash dataset preparation**

Module 3: Statistical Modeling Techniques

- Regression models
- Bayesian crash prediction techniques
- Identifying significant **risk factors**
- Model goodness-of-fit evaluation
- Case Study: **Rural road crash analysis using Poisson regression**

Module 4: Machine Learning Approaches in CPMs

- Introduction to decision trees, random forests, and neural networks
- Feature selection for traffic safety prediction
- Model training, testing, and validation
- Performance metrics
- Case Study: Predicting accident hotspots in a city using ML

Module 5: Integration of CPMs in Project Design

- Using CPMs in **geometric design and traffic operations**
- Scenario-based crash prediction analysis
- Safety impact assessment of **intersections, curves, and highways**
- Prioritization of **safety countermeasures**
- Case Study: **Redesign of a high-risk corridor using CPM insights**

Module 6: Safety Intervention Evaluation

- Predictive assessment of **road safety treatments**
- Before-and-after study designs
- Quantifying **accident reduction potential**
- Cost-benefit analysis of interventions
- Case Study: **Effectiveness of rumble strips in rural roads**

Module 7: GIS and Visualization for CPMs

- Mapping crash hotspots
- Spatial analysis of traffic incidents
- Visualization dashboards for **decision-makers**
- Integrating CPM outputs in GIS platforms
- Case Study: **Interactive dashboard for urban traffic safety**

Module 8: Advanced Topics and Emerging Trends

- Connected and autonomous vehicles and safety modeling
- Real-time crash prediction with **IoT and Big Data**
- Smart city and **predictive infrastructure** applications
- Policy and regulatory considerations
- Case Study: **Smart traffic safety system deployment**

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

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
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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