Road Geometry and Safety - Curves, Grades, Sight Distance 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

In modern transportation engineering, understanding road geometry is critical to ensuring road safety, traffic efficiency, and accident reduction. Road Geometry and Safety - Curves, Grades, Sight Distance Training Course is designed for engineers, planners, and road safety professionals seeking to master the principles of road alignment, design standards, and safety optimization. Participants will gain hands-on experience in analyzing horizontal and vertical curves, optimal grade design, sight distance calculations, and hazard identification, leveraging data-driven methods and real-world case studies to enhance decision-making in road design projects.

This course emphasizes practical applications, simulation-based learning, and evidence-based road safety practices. Through immersive modules, participants will explore advanced geometric design techniques, traffic flow analysis, and risk assessment, equipping them with the skills to minimize collisions, improve traffic mobility, and implement sustainable road designs. By integrating international standards, modern design tools, and industry best practices, this program ensures that attendees can translate theory into actionable strategies for safer and more efficient road networks.

Programme Curriculum

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5 days

Course Objectives

1. Analyze horizontal and vertical curves for safe and efficient traffic flow.
2. Evaluate grade design for optimized vehicle performance and safety.
3. Apply sight distance principles in real-world road design.
4. Conduct road safety audits to identify critical hazard points.
5. Integrate geometric design standards and regulations into planning.
6. Utilize simulation tools for curve and grade performance assessment.
7. Implement traffic calming and speed management strategies.
8. Develop risk mitigation plans for high-accident road segments.
9. Interpret accident data analytics for design improvements.
10. Optimize lane width, superelevation, and transition curves.
11. Assess the impact of road alignment on environmental sustainability.
12. Design roads for multi-modal traffic and heavy vehicle accommodation.
13. Apply best practices and case studies for evidence-based road safety improvements.

Target Audience

1. Highway and Transportation Engineers
2. Road Safety Auditors
3. Urban and Rural Road Planners
4. Civil Engineering Students and Researchers
5. Traffic Management Authorities
6. Road Construction Project Managers
7. Policy Makers in Transportation Safety
8. Consultants in Infrastructure and Road Design

Course Modules

Module 1: Introduction to Road Geometry & Safety

- Overview of road geometric design principles
- Importance of traffic safety and accident prevention
- International road design standards
- Case Study: Highway curve accident analysis
- Introduction to geometric safety audits

Module 2: Horizontal Curves

- Types and design of horizontal curves
- Superelevation, transition curves, and spiral design
- Curve speed and vehicle dynamics
- Risk analysis of sharp curves in urban areas
- Case Study: Accident reduction after curve redesign

Module 3: Vertical Curves and Grades

- Design of crest and sag vertical curves
- Grade limitations for safety and comfort
- Impact on vehicle acceleration, braking, and fuel efficiency
- Earthwork and cost considerations
- Case Study: Grade optimization for hilly highways

Module 4: Sight Distance

- Stopping, decision, and passing sight distance
- Effects of road geometry on visibility
- Design techniques for safe sight distances
- Evaluating obstruction and driver perception issues
- Case Study: Sight distance improvements on rural highways

Module 5: Lane, Shoulder, and Cross-Section Design

- Lane width and shoulder design for safety
- Impact on heavy vehicle operation and overtaking
- Pavement and clear zone considerations
- Multi-lane road safety analysis
- Case Study: Urban arterial redesign

Module 6: Traffic Flow & Speed Management

- Vehicle operating speeds on curves and grades
- Traffic calming and speed regulation techniques
- Capacity and level of service (LOS) analysis
- Incorporating simulation tools for speed and flow
- Case Study: Speed management reducing accident hotspots

Module 7: Road Safety Audits & Risk Assessment

- Road safety audit methodologies
- Hazard identification and mitigation strategies
- Risk assessment based on accident data analytics
- Prioritizing high-risk segments for intervention
- Case Study: Comprehensive safety audit of a highway corridor

Module 8: Real-World Case Studies & Best Practices

- Lessons from global road design projects
- Application of innovative safety solutions

- Cost-effective design interventions
- Data-driven continuous improvement practices
- Case Study: Integrated safety design in a mixed-traffic corridor

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

Start Date	End Date	Location	Price
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

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

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