

## **(Course Code) – Collision Reconstruction**

**Instructor:** J.J. Catania

**Office:**

**Email:** [jcatania@30fe.com](mailto:jcatania@30fe.com)

**Lectures:** (Scheduled time and room)

**Tutorial:** (Scheduled time and room)

### **Calendar Description:**

This course provides the participant with a comprehensive understanding of widely-accepted techniques of vehicular collision reconstruction based on physical and engineering principles. The course covers Energy, Impulse and Momentum fundamentals and how they are engaged to obtain valuable information from collisions, in order to answer important questions about culpability in various litigation arenas. Content is reinforced with real-world examples. A wide variety of collision types (passenger vehicle, motorcycle, cyclist, pedestrian, heavy truck) and modes (high speed, low speed, rollover, tire failure) are addressed in the context of various contributors to collisions, whether they be from the operator, vehicle, or the roadway environment. Specialized techniques for evaluation of the use, performance, and effectiveness of restraint systems, and the avoidability of collisions are also covered. The latest technologies for harvesting data from ‘black boxes’ are covered, and state of the art computer simulation techniques are incorporated into the teachings.

### **Course Grade:**

- TBA

### **Course Materials:**

1. Supplementary Text: Fricke, Lynn B., *Traffic Accident Reconstruction*, Northwestern University Traffic Institute, 2010.
2. Course Notes

**Course Modules:**

Number	Description	Readings
1 Introduction	<ul style="list-style-type: none"><li>• Collision Reconstruction in Context: Societal Need, Approaches, and Process</li></ul>	tba
2 Basic Principles	<ul style="list-style-type: none"><li>• Underlying Physical Principles</li><li>• Geometric, Mass and Inertial Properties</li><li>• Data Collection and Examination</li></ul>	tba
3 Vehicle Dynamics	<ul style="list-style-type: none"><li>• Energy Applications</li><li>• Physics of Straight Line Motion</li><li>• Newtonian Mechanics</li><li>• Friction, Stopping Distance</li><li>• Vehicles in Yaw</li></ul>	tba
4 Collision Dynamics	<ul style="list-style-type: none"><li>• Momentum Methods and Restitution</li><li>• Crush Energy Absorption, 'CRASH3' Methodology</li><li>• Rollovers</li><li>• Vulnerable Road Users (Pedestrian and Cyclist Collisions)</li><li>• Low Speed Collisions</li></ul>	tba
5 Specialized Reconstruction Topics	<ul style="list-style-type: none"><li>• Avoidability of Collisions</li><li>• Hydroplaning</li><li>• Restraint Use and Effectiveness</li><li>• Roadway Factors</li><li>• Human Factors</li><li>• Heavy Truck Collision Reconstruction</li><li>• Motorcycles</li><li>• Tire Failure Investigations</li><li>• 'Black Box' Data Harvesting</li><li>• Computer Simulation</li></ul>	tba