

# Dynamics of Heavy Trucks



COLLEGE OF ENGINEERING  
**INTEGRATIVE SYSTEMS + DESIGN**  
UNIVERSITY OF MICHIGAN

PROFESSIONAL CERTIFICATE PROGRAM

## There Are No Little Mistakes When It Comes to Heavy Trucks

Whether you are relatively new to truck dynamics or an old hand, this course is your chance to learn about vital truck systems. It covers how they work and interact, and how to avoid expensive mistakes that take your products off the road. Information-packed lectures, hands-on simulations, case studies, and real world examples will keep you focused from start to finish. Bring your questions for our experts!

Learn more and register:

[isd.engin.umich.edu/HeavyTrucks](https://isd.engin.umich.edu/HeavyTrucks)

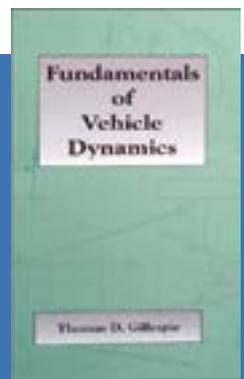


## Learn More About the Unique Performance Properties and Engineering Requirements for Heavy Duty Trucks

This course is structured in three parts. It begins with a brief review of the fundamentals of vehicle dynamics. Next, the details of truck components and their properties are examined. Finally, these two subjects are merged to reveal the special dynamic behavior of heavy truck systems. A half-day computer session is included.

### He Wrote the Book on Vehicle Dynamics

Course instructor, Professor Thomas Gillespie, is the author of *Fundamentals of Vehicle Dynamics*, the first book to provide comprehensive coverage of vehicle dynamics in a single volume.



# Instructors

## Christopher B. Winkler

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## Richard Radlinski

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Vehicle Braking Systems

## Michael Sayers, Ph.D.

Head of Engineering,  
Mechanical Simulation Corporation

## Program Components

### Fundamentals of Heavy Duty Trucks

- Categories of performance
- Subsystems of the vehicle
- Terminology, sign conventions, symbols
- Overview of vehicle dynamics theory
- Contrasts between motor car and heavy duty truck

### Truck Components: Physics & Math Models

- Mechanics of the heavy duty truck tire
- Behavior of heavy duty truck suspensions
- Kinematics and mechanics of steering systems
- Heavy vehicle brake system basics
- Thermal capacity
- Electronic control systems

### Heavy Duty Vehicle System Modeling

- Simplifying assumptions
- Unit truck and articulated vehicle models

### Dynamic Behavior of Heavy Duty Trucks

- Ride quality
- Off-tracking
- Steady state and transient response to steering in the linear and non-linear performance ranges
- The rollover process with the influence of slosh and shifting loads
- Multi-unit vehicles
- Functional vehicle control
- Active safety systems
- Naturalistic driving studies
- Highway geometric features and large truck interactions
- Connected vehicles
- Braking response
- Brake force distribution
- Stopping distance

# Program Details

## Certificate

A non-credit certificate of professional achievement in Dynamics of Heavy Duty Truck Systems will be awarded upon successful completion of this program.

2018  
Program  
Date

May 14-17

Ann Arbor, Michigan

## How to Register

Visit our program web page at [isd.engin.umich.edu/HeavyTrucks](http://isd.engin.umich.edu/HeavyTrucks), send an email to [isd-answers@umich.edu](mailto:isd-answers@umich.edu) or call (734) 647-7200.

## Degrees of Success

Whatever your professional dreams, you'll be a step ahead with exceptional graduate degree programs offered through ISD. These programs are immediately useful and relevant and some can be completed entirely online.

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For more information, contact us at (734) 647-7200 or [isd-answers@umich.edu](mailto:isd-answers@umich.edu).

## Free TruckSim® Software Trial

All paid registrants for Dynamics of Heavy Duty Trucks receive a free time-limited trial of TruckSim® in advance of the program. TruckSim® is a software tool for simulating and analyzing the dynamic behavior of medium to heavy trucks, buses, and articulated vehicles. It will be used in a hands-on computer simulation session.

Learn more at:  
[carsim.com/products/trucksim](http://carsim.com/products/trucksim)



## Program Benefits

Upon completing this program, you will:

- Gain an understanding of the fundamental principals that determine the handling and ride performance of pneumatic-tired vehicles
- Examine the special mechanical and geometric properties that determine the unique performance properties of commercial trucks
- Understand the influences of the mechanical properties of subsystems and components on the dynamic performance of the total vehicle system
- Gain exposure to methods and tools available to analyze truck behavior

## Who Should Attend

In addition to vehicle dynamics engineers, this course is intended for those engaged in activities such as:

- Truck and truck component design
- Truck equipment selection
- Fleet safety operations and equipment specification
- Accident prevention
- Development of truck safety standards
- Highway/truck interaction
- Measuring vehicle behavior
- Highway safety standards and regulations

## Keep Current with the Latest Research and Information

Whether you attended this program ten years ago (or more) or are new to the field, you could benefit from learning about the latest research on truck mechanics.





## About Michigan Engineering and Integrative Systems + Design

The University of Michigan's College of Engineering was founded in 1853. Today, Michigan Engineering and its academic departments rank in the top ten in their respective areas (U.S. News and World Report). The faculty's ongoing research and industry consultation in engineering contribute to Michigan's strength and impact on professional development. Michigan Engineering's research expenditures for fiscal 2014 totaled \$217.9 million, placing it in the forefront of collegiate engineering research in the U.S.

Integrative Systems + Design (ISD), a division of Michigan Engineering, offers credit courses to students on campus and at locations around the world. Recognized as a global leader in online education in addition to offering on campus programs, ISD provides lifelong learning to technical professionals, and has served more than 100,000 with intensive short courses, conferences, professional certifications, and online advanced degree and certification programs.

ISD responds to the needs of industry, healthcare, government, the military, and non-profit organizations with specialized education programs.

For more information about ISD, visit [isd.engine.umich.edu](http://isd.engine.umich.edu)

Questions? Email [isd-answers.umich.edu](mailto:isd-answers.umich.edu)

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