ME196E/(ME145) VEHICLE CRASH RECONSTRUCTION

SYLLABUS

DESIGNATION: Mechanical Design and Mechatronic Systems

CATALOG DESCRIPTION:

ME196/ME145 Vehicle Crash Reconstruction
A course in forensic engineering to study state of the art technology in vehicle that contribute to passenger safety and stability. Study of seat belts, airbags and electrohydraulic stabilizers. Application of principles of dynamics for forensic investigation and reconstruction of vehicle collisions. Study of the EDR’s (Event Data Recorders), data analysis and verification with real cases using classical reconstruction techniques and the use of computer simulations in two and three dimensions. The applications will range from motorcycles, passenger cars and commercial vehicles. A final project using real cases is required.

COMPUTER USAGE

The course will provide students an opportunity to study using state of the art software. Knowledge of SOLIDWORKS or similar software is highly recommended. Use of WORKING MODEL 2D, SYMWISE4D, ADAMS.

INSTRUCTOR: Prof. José J. Granda
Riverside 5002, 916- 278-5711
Email: grandajj@ecs.csus.edu

OFFICE HOURS: Tu – Th  2:00-3:30 pm  or by appointment

TIME: 12 pm- 1:15 pm.

PLACE: ARC 1014

WEB PAGE: Course documents will be posted on the instructor’s web site.

PREREQUISITE: E110, ME 105
GRADED: Graded Student.
UNITS: 3.0. Lecture three hours.
TEXT: Traffic Crash Reconstruction, 2nd Edition, Lynn B Fricke  Northwestern University, Center for Public Safety


REFERENCE:


- Handbook of Accident Reconstruction by Heinz Burg, Andreas Moser

- Vehicle Accident Analysis and Reconstruction Methods, (R-397) (Premiere Series Books) 2nd Revised edition Edition, Raymond M. Brach (Author), R. Matthew Brach (Author)


- Motorcycle Accident Reconstruction and Litigation, Fifth Edition Kindle Edition by Paul F. Hill (Author), Kenneth S. Obenski (Author), Jack C. Debes (Author), Eric S. Shapiro (Author)

- Commercial Vehicle Accident Reconstruction and Investigation, Second Edition Kindle Edition by Roy F. Sutphen (Author), Rick W. Varner (Author)


- “SOLIDWORKS” User’s manual

- “WORKING MODEL 2D” Users manual

- “SYMWISE4D” User’s Manual
ME196E VEHICLE SAFETY AND CRASH RECONSTRUCTION

COURSE CONTENTS

1. Review of Kinematics of particles and rigid bodies
2. Review of Forces, accelerations, rigid bodies.
3. Electronic Crash Scene Measurements and After Crash Situation Maps Using Computers
4. Process of Traffic Crash Reconstruction, Causes and Contributing Factors
5. Equations of Motion. Understanding Vehicle Behavior in Crashes
6. Drag Factor and Coefficient of Friction
7. Speed Estimates for Vehicles That Fall, Flip, Vault or Rollover
8. Momentum Methods and Applications
9. Work, Energy and Speed from Damage
10. Rollover Accidents
11. Human factors, Perception and Reaction in Traffic Crashes
12. Use of Event Data Recorders in Passenger cars and Commercial vehicles Crash Reconstruction
13. Reconstruction of Motorcycle Crashes
14. Vehicle Pedestrian Crash Reconstruction
15. Reconstruction of Heavy Truck Crashes