CALIFORNIA STATE UNIVERSITY SACRAMENTO  
The Department of Mechanical Engineering  

ME196E VEHICLE SAFETY AND CRASH RECONSTRUCTION  
SYLLABUS  

DESIGNATION: Mechanical Design and Mechatronic Systems  

CATALOG DESCRIPTION:  

ME196E Vehicle safety and 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, 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. Measuring at the Scene, Drawing after Crash Situation Maps
2. Crash Scene and Vehicle Damage Photography. Photogrammetry for Traffic Crash Analysis
3. Electronic Crash Scene Measurements and After Crash Situation Maps Using Computers
4. Process of Traffic Crash Reconstruction, Causes and Contributing Factors
5. Mathematics and Physics Review, Basic Motion Equations. Understanding Vehicle Behavior in Crashes
6. Drag Factor and Coefficient of Friction
7. Perception and Reaction in Traffic Crashes
8. Speed Estimates for Vehicles That Fall, Flip, Vault or Rollover
9. Momentum Applications
10. Work, Energy and Speed from Damage
11. Steering Overcorrection
12. Use of Event Data Recorders in Commercial Vehicle Crash Reconstruction
13. Use of Event Data Recorders in Passenger Car Crash Reconstruction
14. Reconstruction of Motorcycle Crashes
15. Vehicle Pedestrian Crash Reconstruction
16. Reconstruction of Heavy Truck Crashes