



**INTER AMERICAN UNIVERSITY OF PUERTO RICO  
BAYAMON CAMPUS  
SCHOOL OF ENGINEERING  
MECHANICAL ENGINEERING DEPARTMENT**

**I. GENERAL INFORMATION**

- A. Course Number and Title : MECN 3160–Fundamentals of Vehicle Dynamics
- B. Credits Hours : Three (3)
- C. Contact Hours : Three (3) hours of conference
- D. Prerequisites : MECN 3120 – Advanced Statics and Dynamics

**II. COURSE DESCRIPTION**

Study of the basic mechanical principles governing vehicle dynamic performance. Develop an understanding of the motor vehicle as a system and the primary mechanisms for all modes of performance. Analytical methods in vehicle dynamics. A final project consists of designing and building a SAE competition mini-baja vehicle.

**III. COURSE CONTENTS**

- a. Vehicle dynamics terminology
- b. Components and subsystems of vehicle that influence vehicle performance
- c. Basic mechanics and analytical methods in vehicle dynamics
- d. Axle loads
- e. Engine torque and power
- f. Traction forces
- g. Braking forces
- h. Road loads
- i. Bounce and pitch motions
- j. Cornering loads and performance
- k. Steering Systems
- l. Suspension Systems

**IV. EVALUATION CRITERIA**

The student's evaluation is based on the following:

Partial exams	(15%)
Homework	(20%)
Final exam	(15%)
Project	(50%)

The professor has the liberty, as an instruction strategy, to assign additional work. The grade qualification system of the Inter-American University of Puerto Rico is:

100-90	A
89-80	B
79-70	C
69-70	D
59-0	F

**V. BIBLIOGRAPHY**

A. Text

Wong, J. Y., Theory of Ground Vehicles, 3<sup>rd</sup> Edition. John Wiley & Sons, 2001

B. References

Gillespie, Thomas D., Fundamentals of Vehicle Dynamics, Society of Automotive Engineers, 1992.

Milliken, William F., Race Car Vehicle Dynamics, Society of Automotive Engineers, 1997.

Staniforth, Allan, Competition Car Suspension: Design, Construction, Tuning, Haynes Pub Group, 1999.