Course Outcomes Guide (COG)

Course Title: EGR 204 Dynamics **Date: May 22, 2015**

Course Team: Ed Sigler

Expected Learning Outcomes

1. Derive and apply the relationships between position, velocity, and acceleration of a particle in rectilinear and curvilinear motion.
2. Derive relations defining the velocity and acceleration of any particle on a rigid body for translation, rotation and general plane motion.
3. Correctly apply Newton's second law to analyze the motion of a particle in rectilinear or curvilinear translation acted upon by forces, or a rigid body in plane motion acted upon by forces and moments.
4. Apply the method of work and energy to problems involving a single particle, a system of particles, or a rigid body in plane motion.
5. Select the method of analysis that is best suited for the solution of a given problem. (Newton's Law, Work and Energy, Impulse and Momentum, or a combination of these methods.)
6. Describe and analyze the plane motion of a particle relative to a rotating frame.
7. Determine Coriolis acceleration in plane motion.
8. Apply the principle of impulse and momentum to problems of direct and oblique central impact, as well as eccentric impact.

Assessment

The assessment for the course common mid-term and final exams administered to all sections of EGR 204. The problem types and complexity are maintained as constant as possible across semesters to track per class variations.

1. Students are required to compute position, velocity and acceleration of a particle in rectilinear and curvilinear motion.
2. Students are required to compute position, velocity and acceleration of any point on a rigid body in translation, rotation, general plane motion and in rotating reference frames, including Coriolis acceleration.
3. Students are required to apply Newton’s second law to solve the motion of particles acted upon by forces and rigid bodies in plane motion acted upon by forces and moments.
4. Students are required to apply work/energy methods to solve for particle and rigid body motion or force/moments under planar motion.
5. Students must select the appropriate method for solution from the methods instructed.

9. Students are required to apply the principle of impulse and momentum to solve direct, oblique central impact and eccentric impact problems.

Validation

Learning outcomes are assessed through homework problems, midterm exams, and the final exam. Common questions for each exam are given to each section of the course. Data collected from these exams will be used to identify areas of weakness and to adjust instruction accordingly.

Results

Data from Fall 2012 through Spring 2015 have been included. Data for SP 2013 has not been included due to teacher transitions. The delta between final exam scores between years is not significant due to 1) small sample size and 2) difference in exam questions.

Major Findings

Spring 2015: Additional instruction is needed for application of the conservation of momentum to applied problems. Further, applications of Newton's 2nd Law with acceleration need to be stressed. These findings will be addressed though additional instruction, in-class worked examples and additional worked examples via Moodle.

Follow-up

Additional detailed instruction and discussion has been included for moving reference frames – in particular additional real-life examples (car moving around a curve, record player, car driving on the earth) have been included in discussions. The students had a firm grasp of this concept as indicated in test scores for the 2nd exam.

Budget Justification

No additional budget is required for this class.

Course: EGR 204 **SLOA Data** **Faculty Team: E. Sigler**

	SU 2012	FA 2012	SP 2013	FA 2013	SP 2014	FA 2014	SP 2015	SU 2015	FA 2016	SP 2016	SU 2016
# Active students	N/A	11	N/A	N/A	8	N/A	12	N/A	N/A		N/A
%W		18%			0		0				
*# walk-away Fs No final exam/grade = F		1			0		0				
% Success (A,B,C)		77.8			87.5		75%				
Common Comprehensive Final Exam Score Average		81.9			75.0		71%				
Mean course grade		2.38			2.75		2.67				
Item Analysis **Weakest Content Areas**					Moving Reference Frames		Cons of Momentum, 2nd Law				

*% Walk-away Fs = Did not take the final exam and received a grade of F.