Challenges of Flipping the Classroom

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Center for Teaching and Learning Flipped Classroom Panel
May 2018

Course Organization using Blackboard

- Blackboard used as “home base”
- Course arranged in Lessons folders containing all content for each lesson
- Tegrity used to record lecture and example problem videos
- On-line learning system MASTERING ENGINEERING from Pearson used for delivering and grading homework and reading comprehension quizzes
- Learning Catalytics CRS used for peer learning through collaboration


USNA
UNITED STATES NAVAL ACADEMY
BLACKBOARD
Lessons
DYNAMICS:EM232/2002_3002_6001(SPRING-2018-1)
Announcements
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Build Content
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Partner Content
Lesson #1
Course Introduction and Overview of Particle Kinematics
Lesson #2
Particle Kinematics: Rectilinear Motion
Lesson #3
Particle Kinematics: General Curvilinear Motion and Projectile Motion
Lesson #4
Particle Kinematics: Curvilinear motion in n-t coordinates

Lesson #34

Description

First lesson on Linear and Angular Momentum of RIGID BODIES
Read assigned sections and watch lecture BEFORE class.

PRE-WORK

Reading

Read Chapter 19, section 1 - 2

Reading Comprehension Quiz

Go to ME and take the RCQ for this lesson (if one is listed)

Lecture

Attached Files: Lesson 36 - Lecture, RIGID BODY Angular I-M.pdf (1.477

Lecture on derivation of the Impulse-Momentum relations for RIGID BODIES

Example #1

Attached Files: Lesson 36 - Example #1 - solution.pdf (1.901 MB)

RIGID BODY: Impulse - Momentum

Tutorial

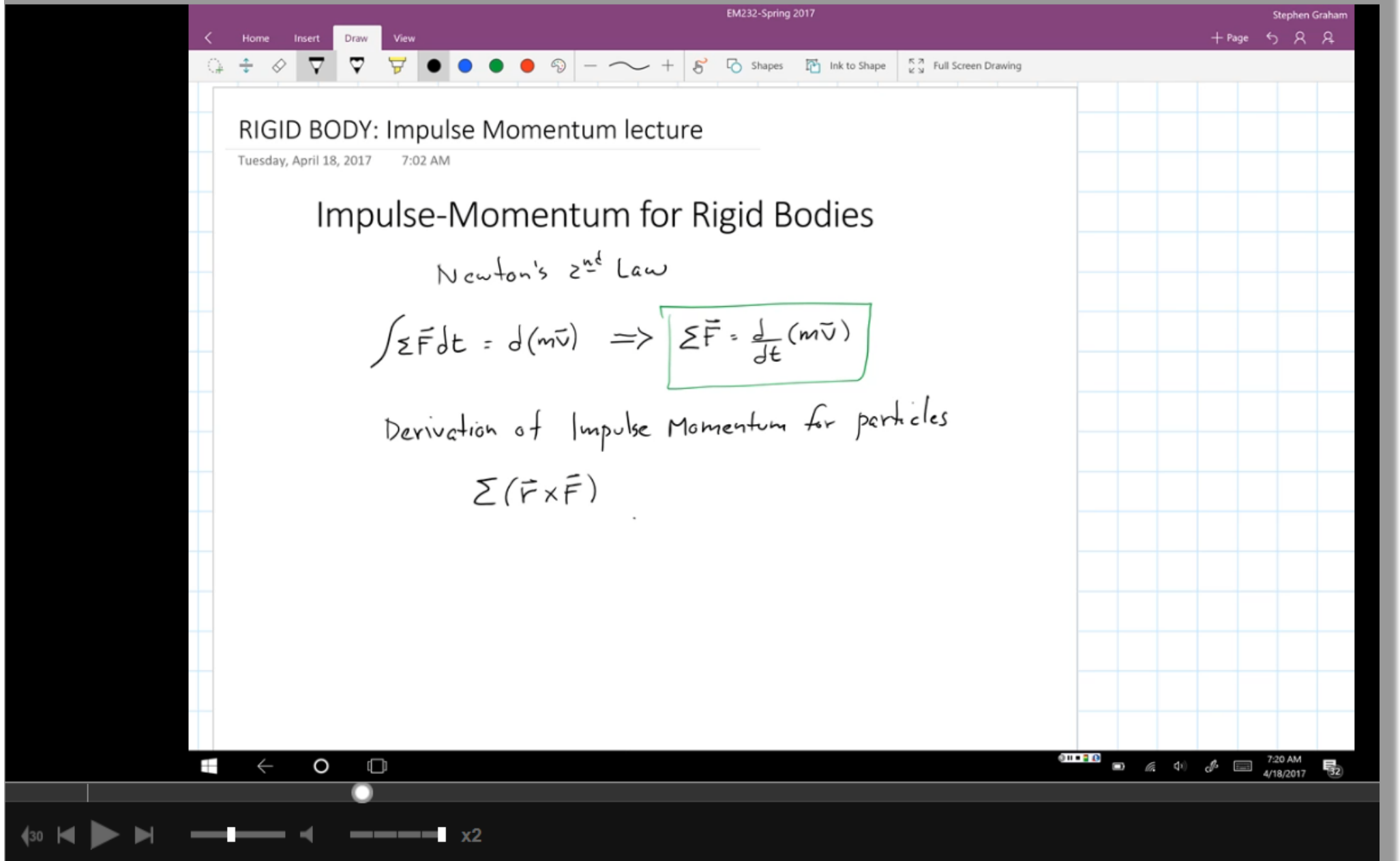
Go to ME and do the Tutorial for this lesson (if one is listed)

Homework

Go to ME and do the HW for this lesson (if one is listed)

POST-WORK

Lesson 36 - Lecture



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What's New in Dynamics 14e

Adaptive Follow-ups: Personalized remediation activities
Reading Questions: 150 new conceptual questions
End of Section problems: 740 new end of section problems

List of content changes from old to new edition

Course Calendar

April 2018 ◄ ►

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 HW #25 Adapt... HW #27 RCQ #28 Tutorial #27	3	4 HW #28 RCQ #29 Tutorial #28	5	6 HW #29 Tutorial #29	7
8	9 HW #27 Adapt... RCQ #31 HW #30 Tutorial #30	10	11 RCQ #32 HW #31 Tutorial #31	12	13 HW #29 Adapt... RCQ #33 HW #32 Tutorial #32	14
15	16 RCQ #34 HW #30 Adapt... HW #33 Tutorial #33	17	18 HW #31 Adapt... HW #34 Tutorial #34	19	20 RCQ #36 Tutorial #35 HW #32 Adapt... HW #35	21

Tutorial #35

Principle of Impulse and Momentum

Learning Goal:

To be able to solve problems involving force, moment, velocity, and time by applying the principle of impulse and momentum to rigid bodies.

The principle of impulse and momentum states that the sum of all impulses created by the external forces and moments that act on a rigid body during a time interval is equal to the change in the linear and angular momenta of the body during that time interval. In other words, impulse is the change in momentum.
The greater the impulse exerted on a body, the greater the body's change in momentum. For example, baseball batters swing hard to maximize the impact force and follow through to maximize the impact time.

This principle holds true for both linear and angular impulse and momentum.

For a rigid-body's planar motion, the equations for the linear impulse and momentum in the *x*–*y* plane are given by

Figure

1 of 1

Part A - Angular velocity of the pulley

The pulley shown (Figure 1) has a moment of inertia I_A = 0.900 $\mathrm{kg \cdot m^2}$, a radius r = 0.300 m , a
Neglecting bearing friction and the cord's mass, express the pulley's final angular velocity in terms
from rest. Use the principle of angular impulse and momentum.

Express your answer numerically in radians per second to three significant figures.

View Available Hint(s)

ω_2 = T radians/s

Submit

Part B This question will be shown after you complete previous question(s).

Instructors: View

HW #35 [Edit]

Overview | Summary View | Diagnostics View | Print View with Answers

Actions

Student View

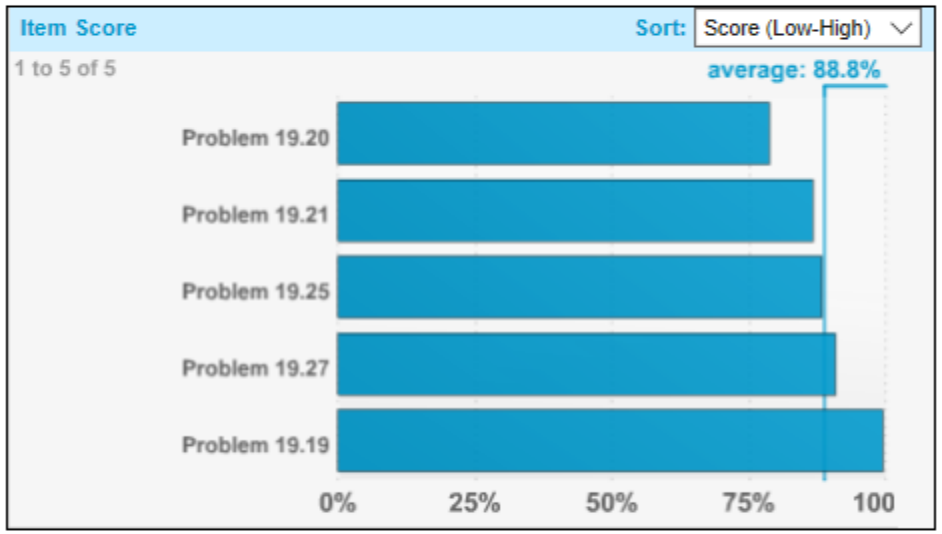
Edit Assignment

Adjust Settings per Student

Edit Grading and Presentation Settings

Copy Assignment to Other Courses

Student Activity



Assignment Information

Due: April 20, 2018 at 11:59pm *PAST DUE*

Available to students ~~(04/16/18 09:00am - 05/31/18 12:00am)~~

Pooling enabled: 3 of 5 items randomly assigned per student worth a total of 30 points.

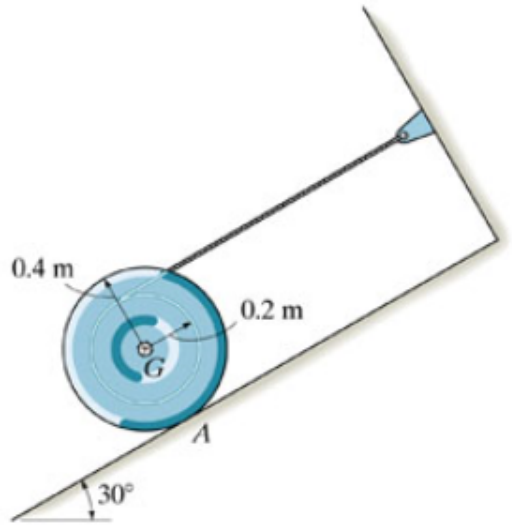
An Adaptive Follow-Up ~~is scheduled for this assignment:~~ ~~HW #35 Adaptive Follow-Up~~

Problem 19.20

The 100-kg spool is resting on the inclined surface for which the coefficient of kinetic friction is $\mu_k = 0.13$. The radius of gyration about the mass center is $k_G = 0.28$ m. (Figure 1)

Figure

1 of 1



Part A

Determine the angular velocity of the spool, measured clockwise, when $t = 8$ s after it is released from rest.

Express your answer using three significant figures. Enter positive value if the angular velocity is clockwise and negative value if the angular velocity is counterclockwise.

$\omega =$ rad/s

Submit Request Answer

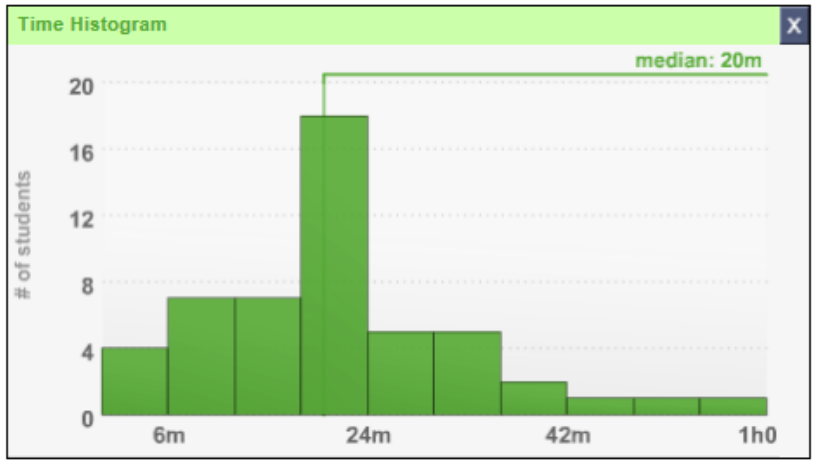
Provide Feedback Next

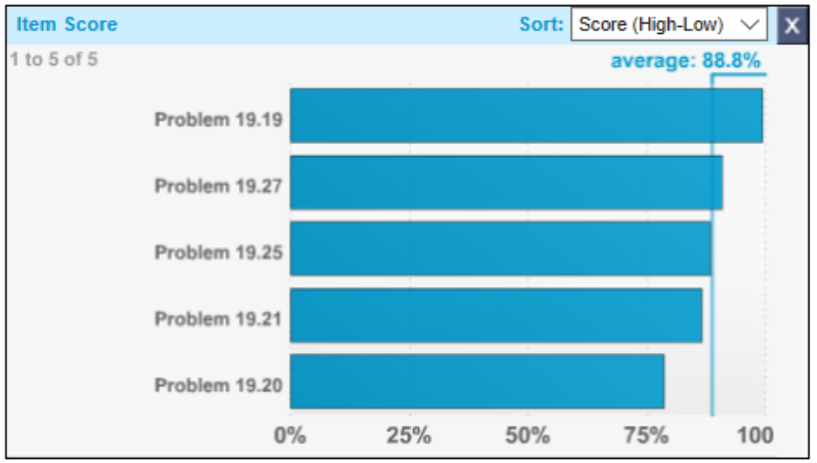
HW #35 [Edit]

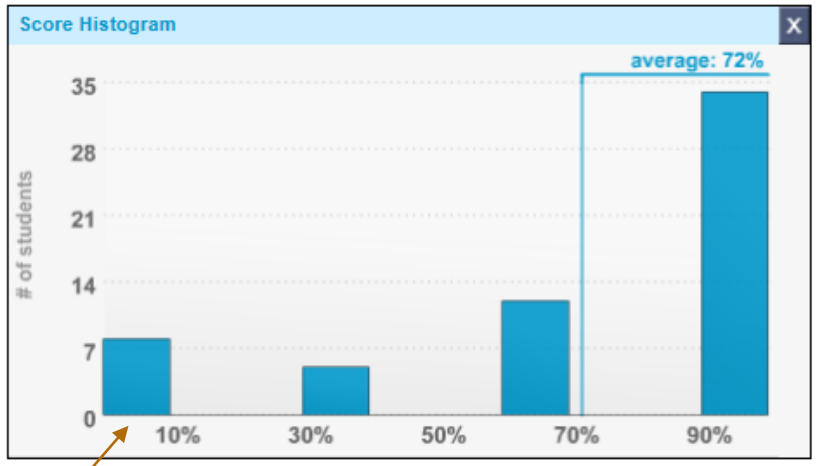
Overview | Summary View | **Diagnostics View** | Print View with Answers

Pooling enabled: 3 of 5 items randomly assigned per student worth a total of 30 points.

Chart: Item Score Add







No submission

In-Class activities for ACTIVE LEARNING

- Warm-up Quizzes to review material from previous class (recall)
- Small group example problem solving (application)
- Large group incremental example problem solving
- Instructor problem solving (not so active but focused on teaching technique)
- Individual problem solving with Classroom Response System and Smart Grouping using Learning Catalytics

In-Class Learning

Ask students questions during class to assess their understanding in real time.

Learning Catalytics

Learn Mor

- Getting Started
- How-To Video T
- Master Content
- Get Your Studer
- FAQs
- Best Practices
- Ask an Expert M

learning | catalytics™

Stephen Graham | United States Naval Academy | Log out

Courses | Questions | Classrooms | Training and Support | Help | Feedback | Student view

My Courses > EM232: Dynamics > **Final Exam Review**

Current session: **42686129** | **connecting...**

Stop session

Edit | Open student window | + Ask a new question on the fly

◀ Jump to ▼ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 ▶

10. multiple choice

A A B D D

Deliver again | Assign groups | Show all results

For part c) of problem 1, what approach would be the best way t

A. Force-Accel

B. Work-Energy — A A A

C. Linear Impulse-Momentum

D. Angular Impulse-Momentum

E. Combination of Linear and Angular I-M — A B A C

Answer

A — A A A A

Round 1

16 responses, 69% correct

A. 69%

B. 13%

C. 6%

D. 13%

E. 0%

The Challenges

- Some students don't do the pre-work, reading and reading comprehension quizzes, and/or post-work tutorials and/or homework.
- Students "game" the system by using on-line solutions (Chegg) and ????
- Since I am not collecting homework, students get sloppy with solutions and take shortcuts, both of which lead to errors that show up on exams.
- Given 6-chances to get a HW problem correct, some students find their way to the correct answer without understanding why.