For info on our summer events, please check our website soon….

HTTP://EDUCATIONGROUP.MIT.EDU

EDX PLATFORM FOR RESIDENTIAL COURSES

EXAMPLES AND COMPARISON TO MOOCS

Saif Rayyan
srayyan@mit.edu
Physics, MIT

and many many collaborators!

History

Spring 2012

Edx (MITx) offered ***6.002x***

RELATE offered ***Mechanics Online*** -loncapa

Summer 2012

RELATE offered ***Mechanics Online*** focused on certification for Teachers+ Moved Content to Edx

Fall 2012

Edx/MITx for Residential Courses (***8.01***)

Formation of ODL→***MITx***

Spring 2013

Expanded Residential Offerings

Spring 2013

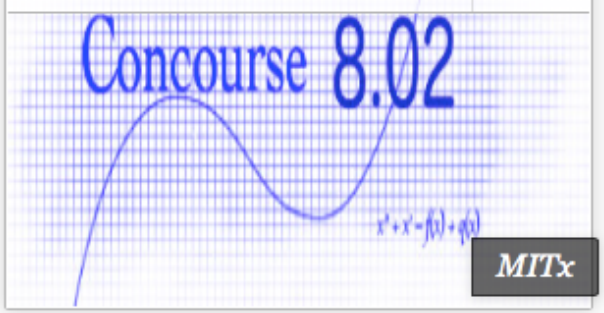
https://lms.mitx.mit.edu

MITX HOME | FIND COURSES

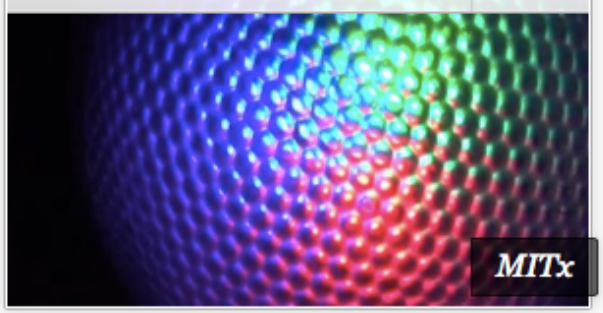
srayyan

MITx: Digital Learning Online

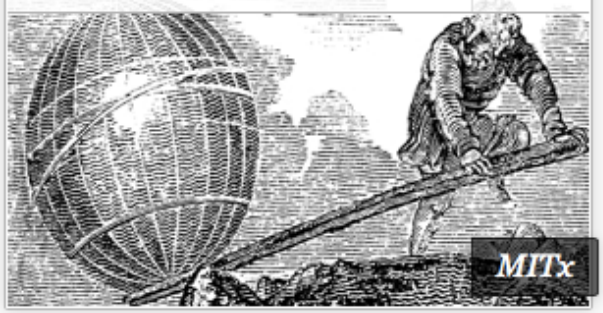
CC.802 Concourse Physics II



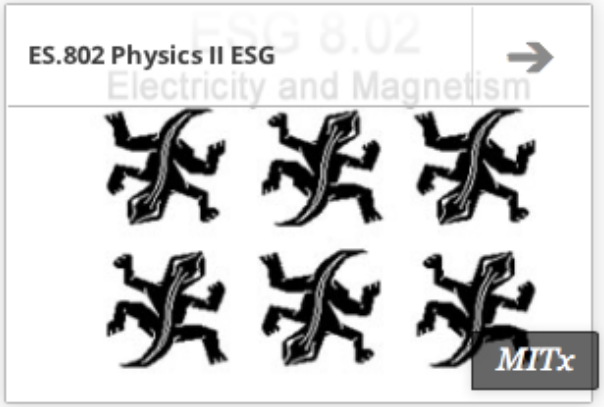
3.022 Microstructural Evolution in Materials



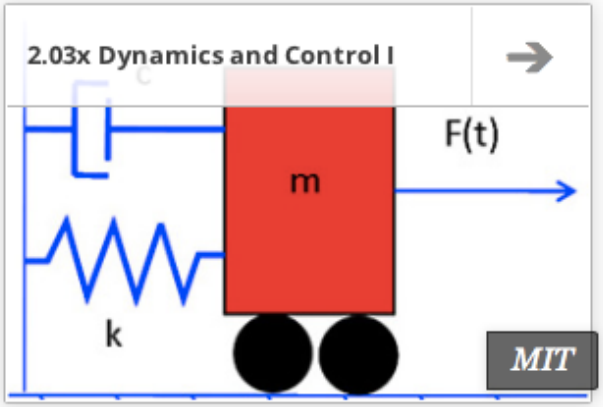
8.011 Introductory Mechanics



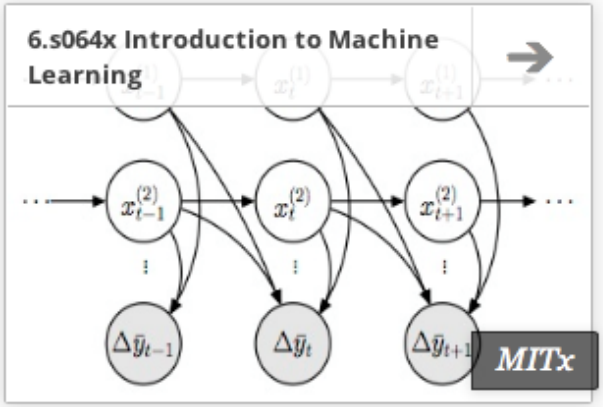
ES.802 Physics II ESG



2.03x Dynamics and Control I



6.s064x Introduction to Machine Learning



Why use MITx in Residential?

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a) MIT (College) is expensive, move it online
b) MIT GIRs are useless
c) MOOCs are cool
d) None of the above

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Why use MITx in Residential?

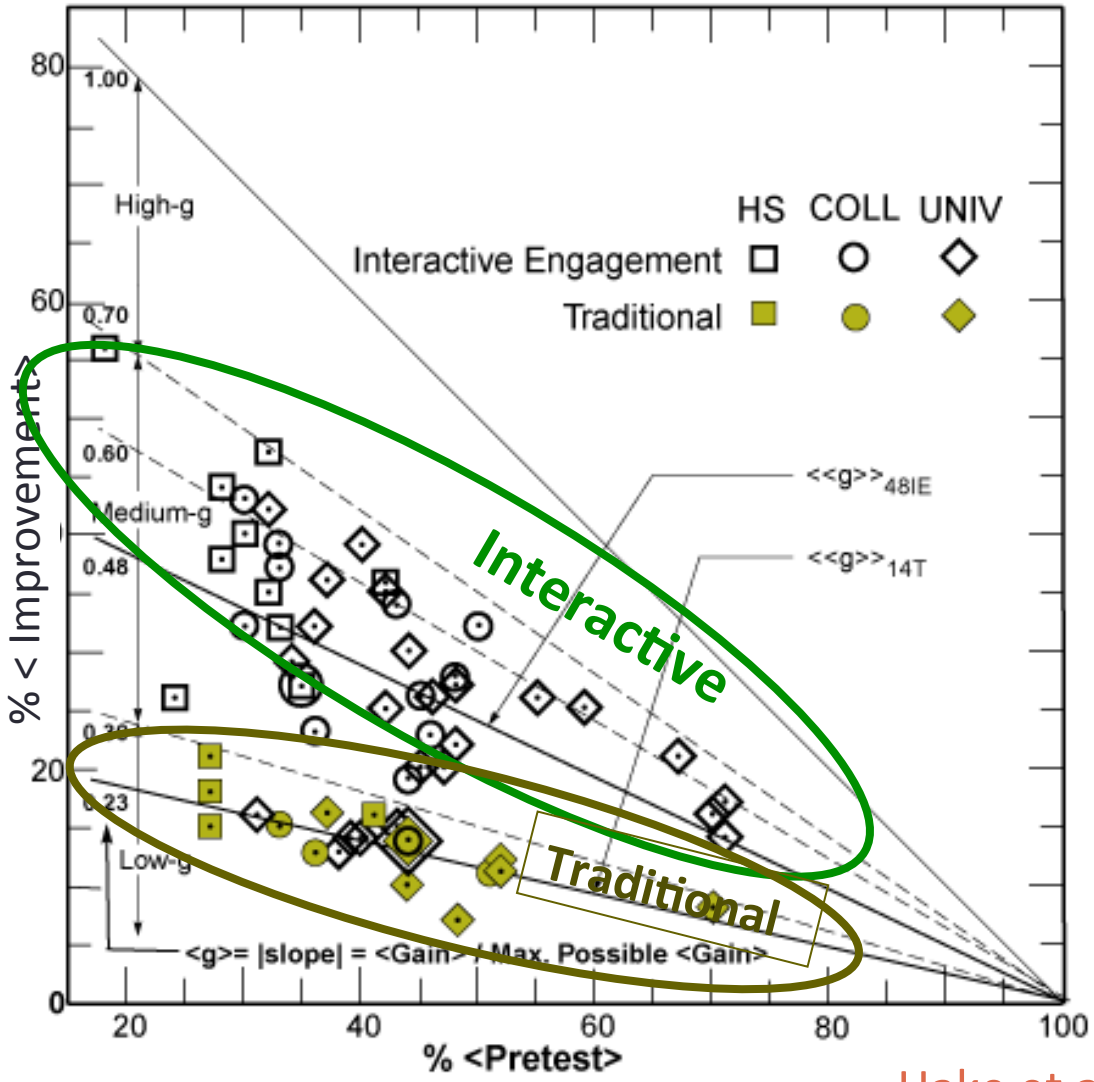
LESSON:

If it is not broken, don’t fix it.

Physics GIRs @ MIT

- Moved to studio format (TEAL) ~2000
- Tables 3 groups of 3 students each
- Tons of white board space.
- Experiments integrated in the class

Why TEAL?



Courses using Interactive Engagement (e.g. peer instruction) have much higher gain (0.48 compared to 0.23)

Hake et al . 1996, 6000 students, 62 classes

Physics GIRs @ MIT

TEAL- Good:

- ***Interactive engagement***: group problem solving, mini-experiments, E&M visualizations, Higher staff-student ratio.

Physics GIRs @ MIT

TEAL- Good:

- ***Interactive engagement***: group problem solving, mini-experiments, E&M visualizations, Higher staff-student ratio.
- ***Use of Technology*** (to increase interactivity): Clicker questions, Simulations, Visualizations.

Physics GIRs @ MIT

TEAL- Good:

Increased Attendance

Lower failing rates

More flexibility

Physics GIRs @ MIT

- TEAL- what is not working?

- ***Reading***
  - Read or not?
  - Too much material
  - Not interactive
- ***Homework***
  - What do students do?
  - Delayed feedback
- TEAL is ***not*** designed ***for lecture***

Physics GIRs @ MIT

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Experiments on MITx

Reading:

Reading questions (8.01 Fall 2012)

Interactive e-text (8.01cc and 8.01esg Fall 2012)

Flipped Classroom: watch lectures before coming to class (8.02cc and 8.02esg Spring 2013)

Experiments on MITx

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Interactive e-text (8.01cc and 8.01esg Fall 2012)

Flipped Classroom: watch lectures before coming to class (8.02cc and 8.02esg Spring 2013)

Homework:

Online homework (8.01CC/Esg).

Written homework + check answers online (8.01, 8.02 cc and esg)

Experiments on MITx

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Online homework (8.01CC/Esg).

Written homework + check answers online (8.01, 8.02 cc and esg)

Vs Edx-Whole course:

8.02x (based on Walter Lewin's Lectures)

8.01x (based on Walter Lewin's Lectures)

8.01 Reading Questions Fall 2012

2011

Paper based, open response

- Collected at the beginning of class
- Graded by undergraduate TAs (>1500 Sheets/week)

2012

Mostly Multiple choice, graded by edx.

- 20 assignments. Questions target:
  - Simple numerical calculations
  - Conceptual understanding
  - Checking if students did the reading

October 3/4 W05D2 Continuous Mass Transport and Rocket Equation

Reading Assignment:

Course Notes:

Continuous Mass Transport and Rocket Equation

Suggested: Young and Freedman: 8.6

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Course Notes:

Continuous Mass Transport and Rocket Equation

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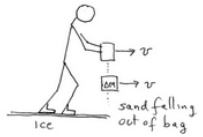
MAN WITH A SAND BAG

A person is skating on an icy surface (frictionless). She is holding a bag of sand that is leaking at the rate of b kg/s. The sand leaves the bag at the same speed as the skier.



What happens to the speed of the person as the sand keeps leaking from the bag?

- (•) the speed increases
- ( ) the speed does not change
- ( ) the speed decreases
- ( ) there is not enough information to decide.

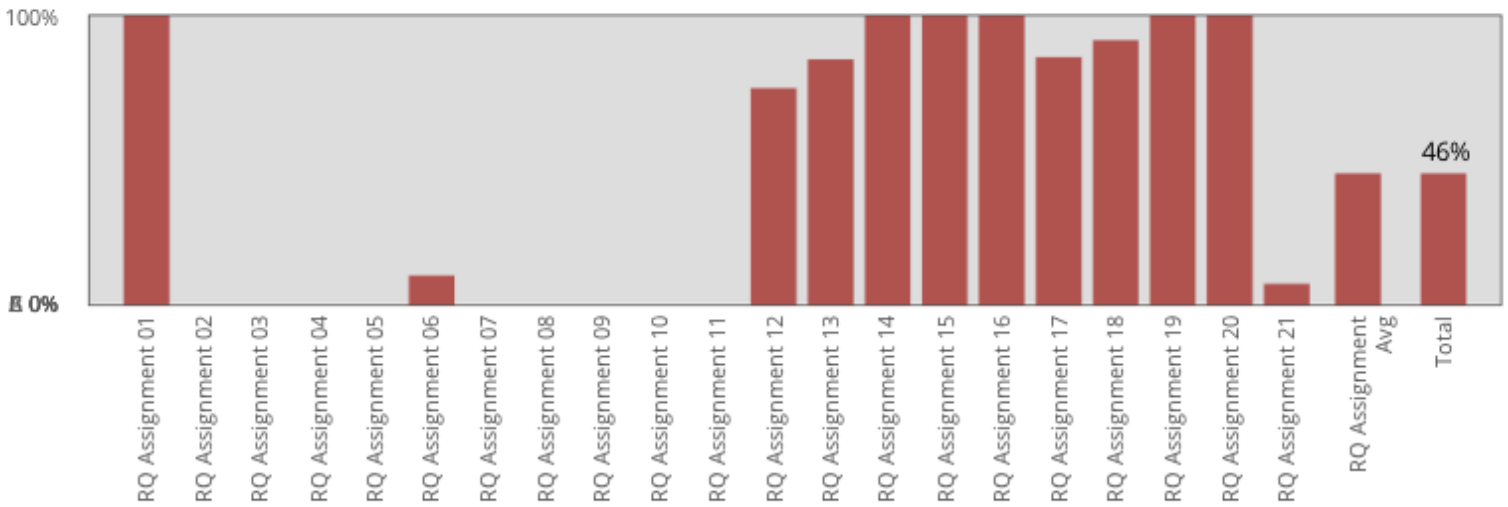
✔

Show Answer

Reading Questions

- 129 questions (~200 parts), 49 new
- Types: 112 M-C, 15 numerical, 2 symbolic.
- Staff time commitment: 5-10 hours/week
- Quality control: 1-2 Grad TAs checking.

Course Progress



Week 1

Week 1 Assignment 1 (W1D3) (12/12) 100%

Reading Question *due 2012-09-07T8:45*

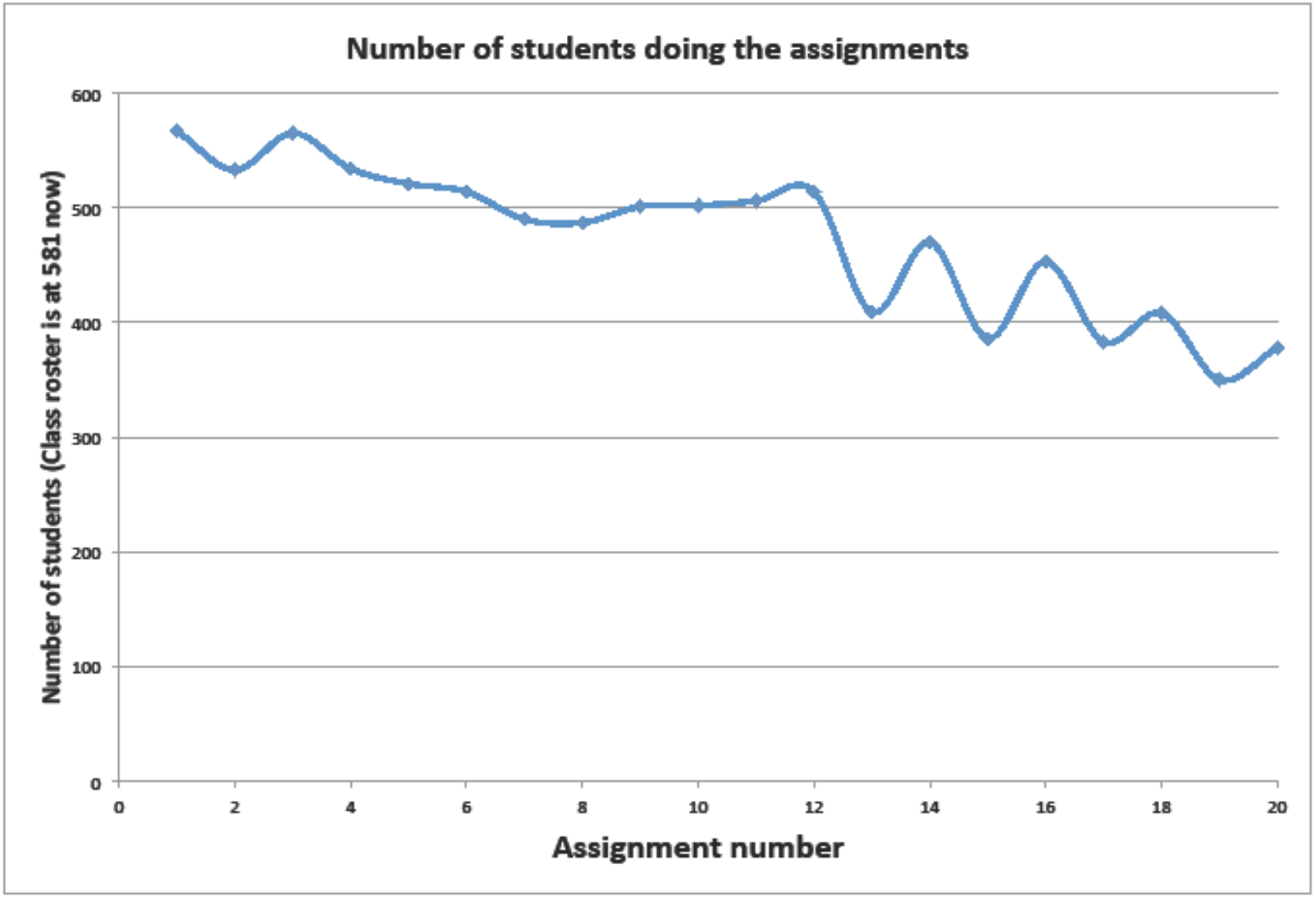
Problem Scores: **8/8** **1/1** **1/1** **1/1** **1/1**

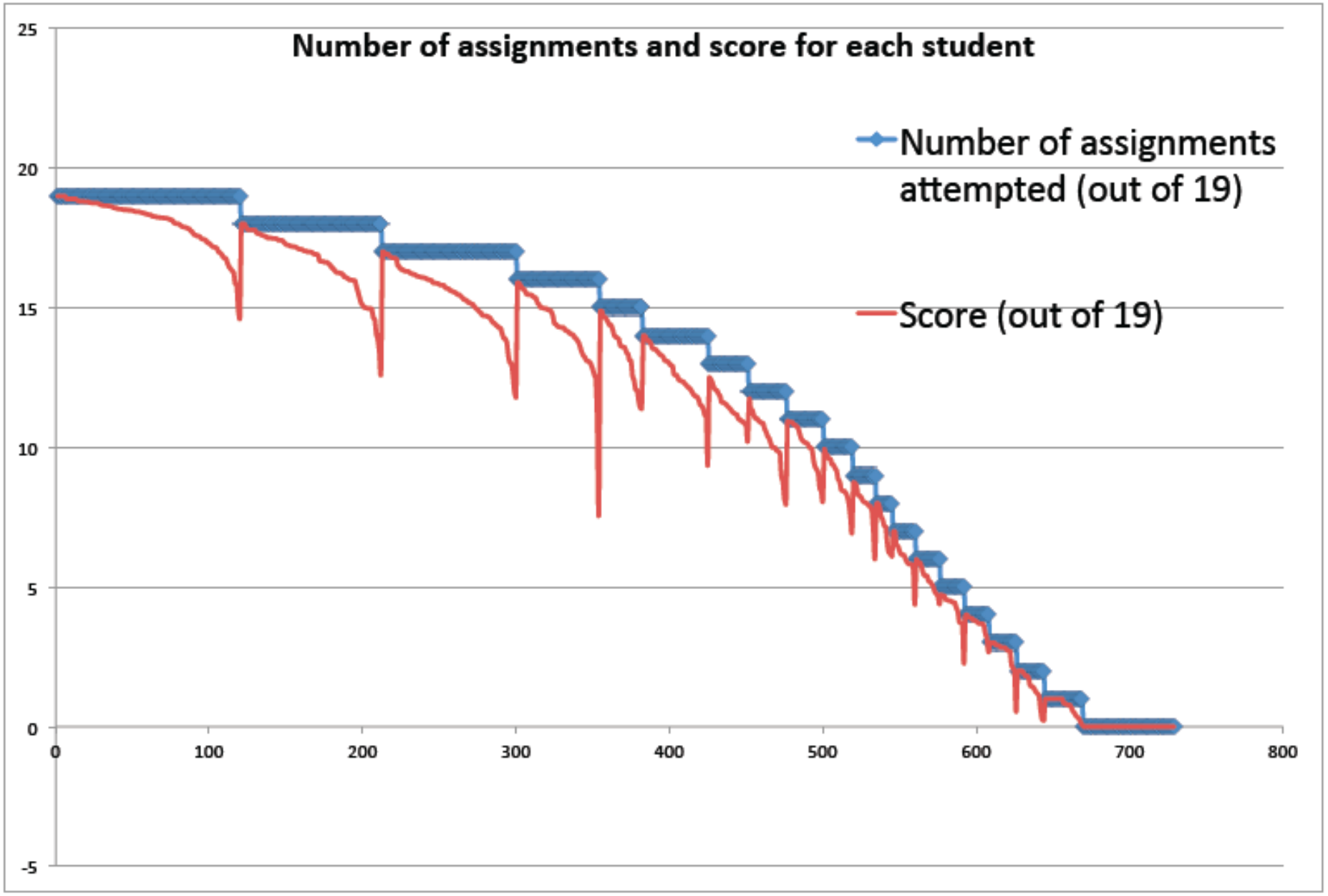
Week 2

Week 2 Assignment 1 (W2D1) (0/19)

Reading Question *due 2012-09-10T8:45*

Problem Scores: **0/11** **0/1** **0/3** **0/3** **0/1**


Number of students doing the assignments
Number of students (Class roster is at 581 now)
600
500
400
300
200
100
0
0
2
4
6
8
10
12
14
16
18
20
Assignment number

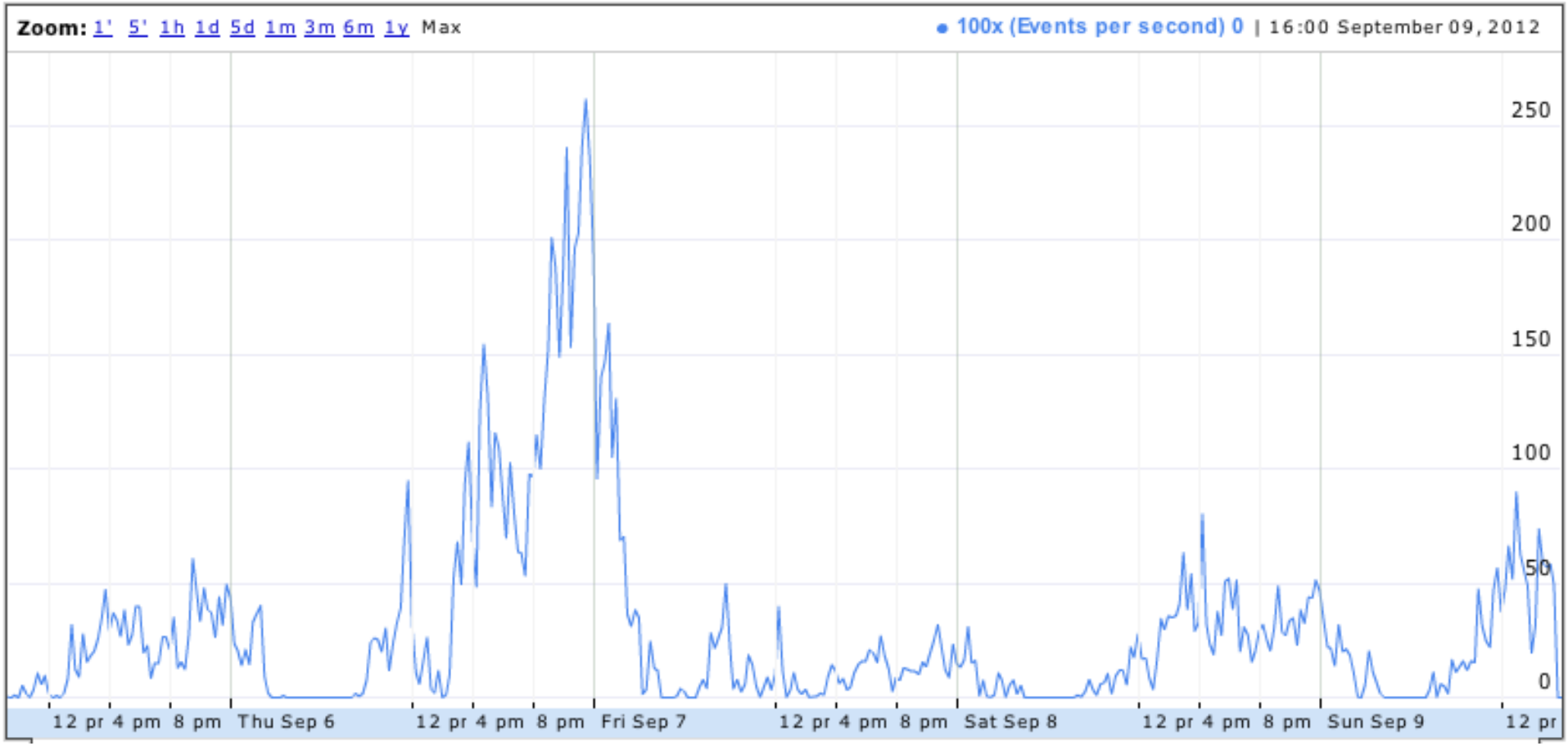

Number of assignments and score for each student
Number of assignments attempted (out of 19)
Score (out of 19)
25
20
15
10
5
0
-5
0
100
200
300
400
500
600
700
800

Student Feedback

- Mixed: Some loved it, some hated it
- Survey of 61 students
- On a scale of 1..7 ***4.5(±1.3)***
- 7 positive comments, 7 negative comments
- Positive: beneficial, prepare for class
- Negative: Difficult, too much reading, difficulty accessing the assignment

Learned lessons

- Students work around midnight
- Make questions easier
- Enough testing before release


Zoom: 1' 5' 1h 1d 5d 1m 3m 6m 1y Max
100x (Events per second) 0 | 16:00 September 09, 2012
250
200
150
100
50
0
12 pr 4 pm 8 pm Thu Sep 6
12 pr 4 pm 8 pm Fri Sep 7
12 pr 4 pm 8 pm Sat Sep 8
12 pr 4 pm 8 pm Sun Sep 9
12 pr

Discussion: Possible use of MITx?

8.02 flipped, concourse and esg

Concourse:

- Students Watch Walter Lewin's lectures (2-3) over the weekend. (Due Sunday night)
- Work on In-class problems+ start with online HW on Monday
- Finish online HW on Wednesday, turn in written solutions Wednesday night
- Quiz on Thursday

ESG:

- No online HW

8.02 flipped, concourse and esg

- Evaluated by TLL (Glenda Stump and Jennifer DeBoer)

- Challenges:
  - Alignment of different curricula
  - Release content before it is ready
  - Trying to do too much
  - Working with a developing platform

- Learning objectives:

Week 6

Lecture 11: Magnetic Field and Torques
Lecture due Mar 18, 2013 at 21:00

Lecture 12: Review for Exam 1
Lecture due Mar 18, 2013 at 21:00

Lecture 13: Moving Charges in Magnetic Fields
Lecture due Mar 18, 2013 at 21:00

Post lecture Assessment of learning objectives
Survey due Mar 18, 2013 at 09:00

Problem Solving
Problem Solving

HW6
Homework due Mar 20, 2013 at 21:00

Post Homework Assessment of learning objectives
Survey due Mar 20, 2013 at 21:00

Week 6

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Post lecture Assessment of learning objectives
Survey due Mar 18, 2013 at 09:00

Problem Solving
Problem Solving

HW6
Homework due Mar 20, 2013 at 21:00

Post Homework Assessment of learning objectives
Survey due Mar 20, 2013 at 21:00

Post Homework

WEEK 6 :LEARNING OBJECTIVES ASSESSMENT

I am confident that I can: (answer using a scale from 1-7, 1 being least confident and 7 being most confident)

calculate the force on a charge moving in a magnetic field.

- ( ) 1 Not Confident at all
- ( ) 2
- ( ) 3
- ( ) 4 Moderately Confident
- (•) 5
- ( ) 6
- ( ) 7 Very Confident

explain the magnetic field of a set of Helmholtz coils in the Helmholtz and anti-Helmholtz configuration.

- ( ) 1 Not Confident at all
- ( ) 2
- ( ) 3
- ( ) 4 Moderately Confident
- ( ) 5
- ( ) 6
- ( ) 7 Very Confident

Student Feedback

- Highest rated activities:
  - Handing in Written Assignments 4.4/5
  - Doing homework in class 4.3/5

Positive:

it presents E&M material in an organize manner

I liked to be able to watch the lectures at my own pace

You can check your answers and it acts as a database of your work

Not so Positive

the lecture videos took up a lot of time, and I prefer learning from Analia to learning from a video

There were bugs every now and then

online learning does not work well for me

I learned better in class rather than on a computer screen. I am a visual learner

Best way to learn: Practice problems with someone nearby to help answer questions. 2. Lots of problems.

Collaborators

Analia Barrantes ESG/RELATE
Isaac Chuang and ODL
Dave Pritchard RELATE
Yoav Bergner RELATE
Colin Fredericks RELATE
Raluca Teodorescu GWU
TLL
Peter Dourmashkin Physics
John Belcher Physics
Deepto Chakrabarty Physics
OCW
Concourse
ESG

And many many wonderful graduate and undergraduate students