

COVID-19 as a nudge for an educational overhaul

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Think about all the inconveniences COVID-19 created

Think about all the projects COVID-19 impacted
inconveniences COVID-19 created

Think about all the chaos COVID-19 brought
projects COVID-19 impacted
inconveniences COVID-19 created

I am not going to talk about any of this 😊

Think about all the chaos COVID-19 brought
projects COVID-19 impacted
inconveniences COVID-19 created



Timeline

This can't be
happening to
me!!!

COVID-19
can't stop me
teaching my
class

Denial

Around
mid Feb.

The tortuous path from denial to acceptance

Timeline

This can't be happening to me!!!

Why do I have to teach the most difficult course?!

COVID-19 can't stop me teaching my class

Why me?
What do I do with my course!

Denial

Anger

Around mid Feb.

Timeline

This can't be happening to me!!!

Why do I have to teach the most difficult course?!

I should probably focus on other things...

COVID-19 can't stop me teaching my class

Why me?
What do I do with my course!

Maybe I can take a break from teaching for a semester!

Denial

Anger

Bargaining

Around mid Feb.

Timeline

This can't be happening to me!!!

Why do I have to teach the most difficult course?!

I should probably focus on other things...

Academia is gone! How can we recover out of this

COVID-19 can't stop me teaching my class

Why me?
What do I do with my course!

Maybe I can take a break from teaching for a semester!

This is overwhelming!
I don't know how to do this

Denial

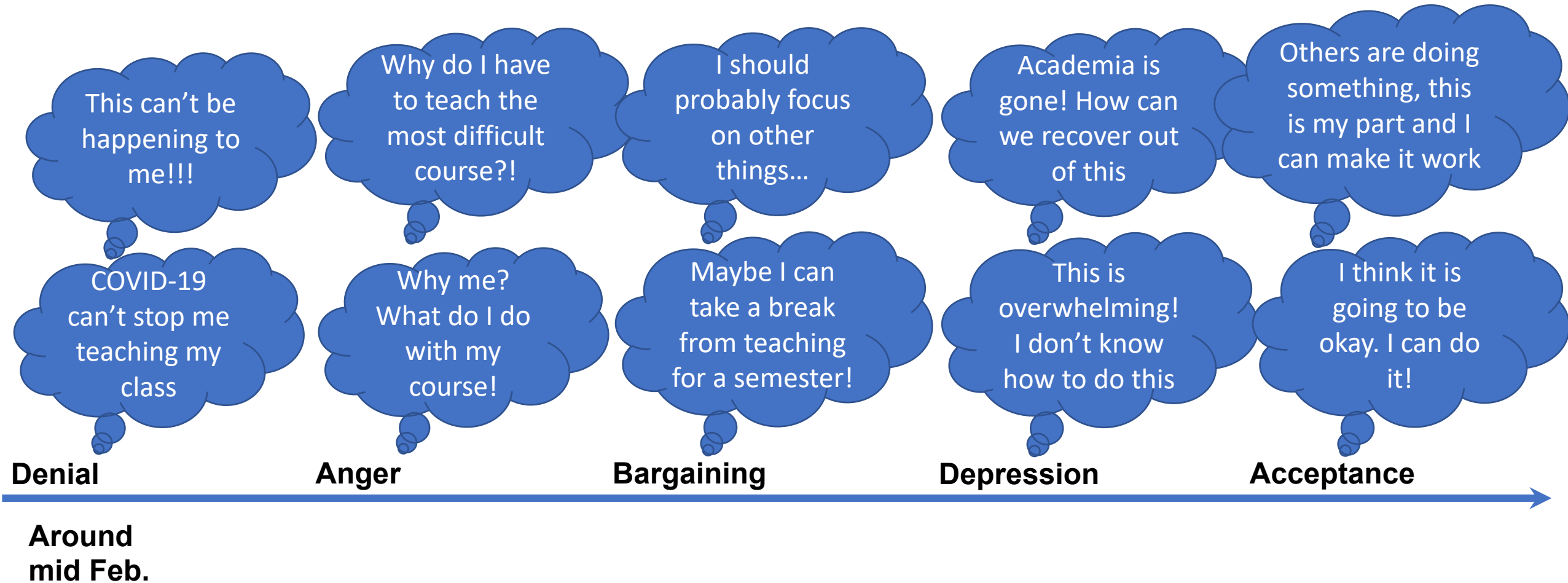
Anger

Bargaining

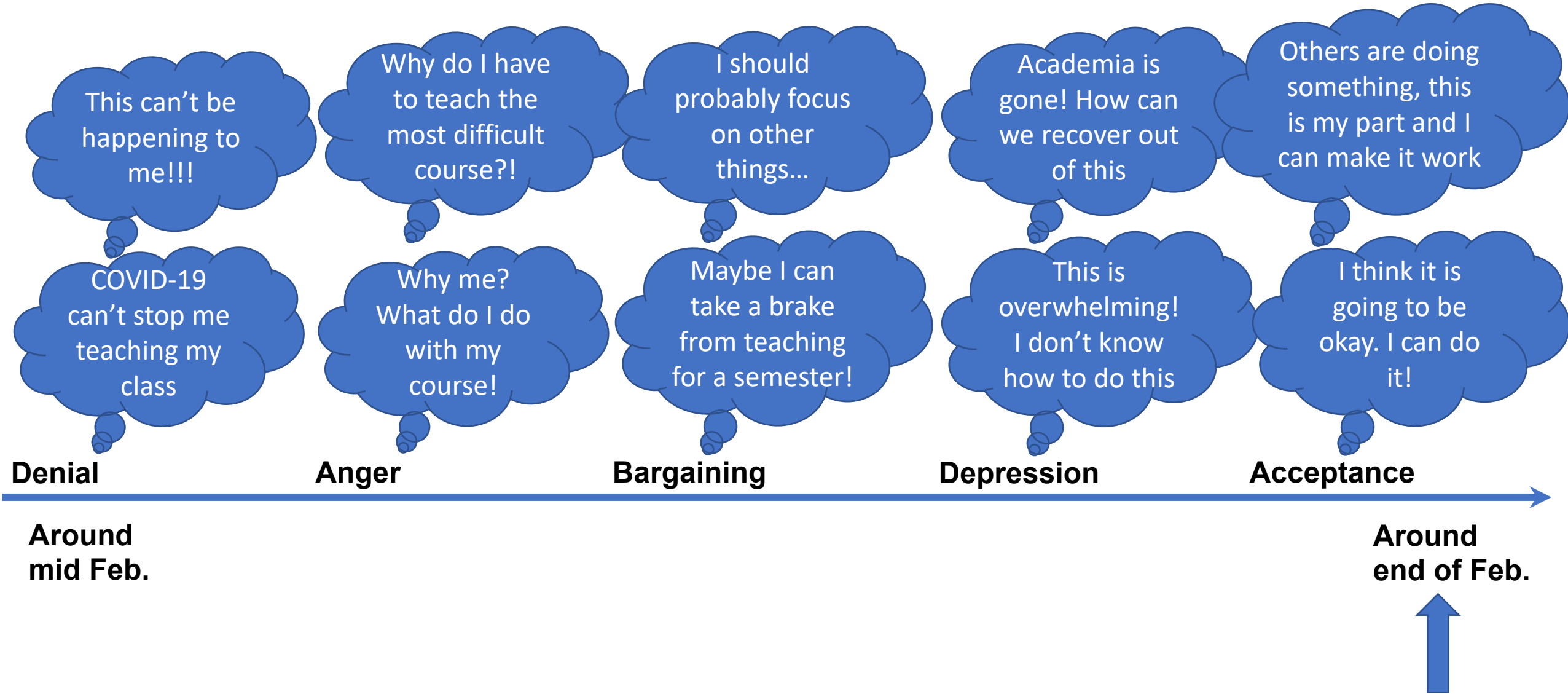
Depression

Around mid Feb.

Timeline



Timeline



My Challenge

**ESM108:
Environmental Monitoring
April-May, 2020**

- **Teaching basics of electronics and environmental sensing;**
- **Hands-on experiential learning with basic measurement technologies and methods;**
- **Building simple sensors using Arduinos;**
- **Introduction to sensors and data loggers;**

**SSC107:
Soil Physics
October-December 2020**

- **Teaching basics soil physics concepts;**
- **Hands-on experiential learning with basic soil physics methods**
- **Understanding fundamental physical concepts with simple experiments**
- **Performing field experiment for extracting basic soil physics parameters**
- **Build hands-on computer literacy**

My Challenge

ESM108: Environmental Monitoring April-May, 2020

Course re-structuring:

Smaller & independent
educational modules;

Max of 10-15% of grade each;

Replace firm deadlines with
flexible guidelines

Create redundancies (choose
7 out of 8, grades out of 105
instead of 100, ...)

The screenshot shows a web browser window displaying a Canvas LMS page. The browser's address bar shows the URL: <https://canvas.ucdavis.edu/courses/453818/pages/module-3-model-and-sensor-calibration-regressions>. The page title is "ESM 108 001 SQ 2020 > Pages > Module 3: Model and Sensor Calibration: Regressions". The page is published, as indicated by a green "Published" button. The main content area is titled "Module 3: Model and Sensor Calibration: Regressions". Below the title, it states: "This module has 15% of your grade. Its learning objectives are:" followed by a list of seven objectives. The objectives are: 1. Learn how to perform a regression using trendline in Excel. 2. Learn how to perform a regression using Data Analysis tool in Excel. 3. Learn how to perform a regression using optimization (minimizing the square of the error) in Excel. 4. Learn how to perform 2-point calibration and multiple points, soil-specific calibration. 5. Learn how to calculate error and mean error. 6. Learn how to back calculate the parameter of interest using sensor output and calibration curve. 7. Learn about secondary sensitivities of sensors including temperature and salinity. Below the objectives, it says: "The narrative of your Module is here: [Module 3 Narrative.docx](#)" and "The data needed to solve this Module is here: [Module 3 Data.xlsx](#)". At the bottom, it requests: "Please submit two files: a pdf file that includes your answers and an Excel file that shows all your calculations." The left sidebar contains navigation options: Account, Dashboard, Courses, Calendar, Inbox (69), UCD Library, History, Commons, Help, and a back arrow. The bottom of the browser window shows the Windows taskbar with the date and time: 8:47 PM 11/4/2020.

My Challenge

ESM108: Environmental Monitoring April-May, 2020

Course re-structuring:

All lab demos were converted into videos and detailed step-by-step process on course page

All demos were discussed in lab and their installation, wiring, and calibration were built in front of students during virtual lab sessions

The screenshot shows a web browser window displaying a Canvas LMS page. The browser's address bar shows the URL: <https://canvas.ucdavis.edu/courses/453818/pages/arduino-projects-and-demonstrations>. The page title is "ESM 108 001 SQ 2020 > Pages > Arduino Projects and Demonstrations".

On the left side, there is a navigation menu with the following items: Account, Dashboard, Courses, Calendar, Inbox (with a notification badge for 70), UCD Library, History, Commons, Help, and a back arrow.

The main content area of the page includes:

- A "View All Pages" button.
- A "Published" status indicator (green checkmark) and an "Edit" button.
- The main heading: "Arduino Projects and Demonstrations".
- A paragraph: "This page contains a range of simple solutions that we prepared for you as demonstration of the capabilities of Arduino and similar platforms in sensing and measurements, so you can see how simple, cheap, and effective using those tools is."
- An example heading: "Example 1: Monitoring Temperature and Humidity using DHT-22 sensor:"
- An image showing two DHT-22 sensors: one blue and one white.
- A paragraph: "DHT-22 is a sensor that costs less than \$10 that can monitor temperature and humidity. It has the following specification as downloaded from (<https://learn.adafruit.com/dht>):"

The bottom of the screenshot shows the Windows taskbar with various application icons and the system clock displaying 8:54 PM on 11/4/2020.

My Challenge

ESM108:
Environmental Monitoring
April-May, 2020

Course re-structuring:

Make videos, lots and lots of them!

Synchronous or Asynchronous? How about hybrid?

The screenshot shows a web browser window displaying the AggieVideo website. The address bar shows the URL <https://video.ucdavis.edu/my-channels>. The website has a navigation menu with links for Home, Getting Started, AggieChannels, Admin, Colleges, Schools, and Subjects. Below the navigation is a search bar labeled "Search For Channels" and a "Filters" button. The main content area is titled "My Channels" and features two video thumbnails. The first thumbnail is titled "The Darcy Equation: Explanation and Basic Application" and includes the text "SSC107_SOIL PHYSICS", "27 Media", and "1 Member". The second thumbnail is titled "ESM108: ENVIRONMENTAL MONITORING" and includes the text "13 Media" and "1 Member". The Windows taskbar at the bottom shows the date and time as 9:09 PM on 11/4/2020.

My Challenge

ESM108: Environmental Monitoring April-May, 2020

Course re-structuring:

Make videos, lots and lots of them!

Synchronous or Asynchronous? How about hybrid?

Filters > Search In: All Fields > Sort By: Creation Date - Descending > + Add to Channel

Duration	Video Title
19:11	ESM108_Week7_Lab_Making Macros in Excel
10:12	Navigating your ESM108 Canvas and Online Resources
23:18	ESM108_Week5_Lab5_Review of Statistics2
25:05	ESM108_Week5_Lab5_Review of Statistics1
44:46	ESM108_Week 4_Lecture 4
37:58	ESM108_Week 3_Lab: Managing Datasets_Intro to...
46:05	ESM108_Lecture 3
37:04	ESM108_Week 2_Lab_Complete
04:16	Intro_TinkerCAD_by AndrewCalderwood

Windows taskbar: 9:11 PM 11/4/2020

My Challenge

ESM108: Environmental Monitoring April-May, 2020

UC DAVIS
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AggieVideo

Home Getting Started AggieChannels Admin ▾ Colleges ▾ Schools ▾ Subjects ▾

SEARCH + ADD NEW MAJDI ABOU NAJM

ESM 108
Lab 1: Welcome to the world of
electronics and sensors

Let's start with a few definitions,
then the fun can start!

0:08 / 34:08

Related Media

Lab 8

12:47
SSC107_2020_24_L12

$$\phi_s = \phi_p + \phi_u + \phi_v + \dots$$
 or $H = H_p + H_u + H_v + \dots$

Remember:
 $\phi_s = [\text{Force}] \times [\text{Distance}] = F \times d = mg \times d = (\rho_w V g) \times H$
 or:
 $\phi_s = \phi / V = (\rho_w g) \times H$
 $\phi_w = \phi / m = g \times H$
 $\phi_w = \phi / w = \phi / mg = H$

H_p - soil water pressure head (can be + or -)

Remember:
 Energy per unit volume of water required to transfer an infinitesimal quantity of water from a reference pool of water at the elevation of the soil, to the point of interest in the soil at reference air pressure and temperature.
 If the soil is unsaturated:
 If the soil is saturated:
 hydrostatic pressure potential, is positive ($H_p > 0$)

- Is this a saturated or unsaturated system?
- Is there flow?
- If so, in what direction?

9:14 PM
11/4/2020

Course re-structuring:
Electronics and circuitry is a completely new concept to my students

My Challenge

ESM108: Environmental Monitoring April-May, 2020

The screenshot shows a video player interface. The video content displays a circuit diagram with four 9V batteries connected to a central point. A component palette on the right includes items like PushButton, Potentiometer, Capacitor, Slidswitch, 9V Battery, Coin Cell 3V Battery, 1.5V Battery, Breadboard Small, Arduino Uno R3, Vibration Motor, DC Motor, Micro Servo, Hobby Geopmotor, and NPN Transistor (BJT). A video thumbnail of a man is visible in the top right of the video frame.

Below the video, the 'Related Media' section shows a 'Device Simulation' window with a spreadsheet-like interface. It includes a timer at 38:34 and the text 'Lab 8'. Below that, there is a slide with mathematical formulas:

$$\phi_s = \phi_z + \phi_o + \phi_a + \dots, \text{ or } H = H_z + H_o + H_a + \dots$$

Remember:
 $\phi = [\text{Force}] \times [\text{Distance}] = F \times d = mg \times d = (\rho_w \times V \times g) \times H$
 or:
 $\phi_w = \phi / m = g \times H$
 $\phi_w = \phi / w = \phi / mg = H$

H_s - soil water pressure head (can be + or -)

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 SSC107_2020_24_L12
 If the soil is saturated:
 hydrostatic pressure potential, is positive ($H_s > 0$)

At the bottom of the video player, there are two bullet points:
 • Is this a saturated or unsaturated system?
 • Is there flow?
 • If so, in what direction?

Course re-structuring:

Electronics and circuitry is a completely new concept to my students

Which circuits are good or bad

Fix a circuit

My Challenge

ESM108: Environmental Monitoring April-May, 2020

UC DAVIS INFORMATION AND EDUCATIONAL TECHNOLOGY

AggieVideo

Home Getting Started AggieChannels Admin Colleges Schools Subjects

Will both LEDs light? None? Or only one of them?

Is there a difference between those two circuits?

Related Media

Lab 8

SSC107_2020_24_L12

9:18 PM 11/4/2020

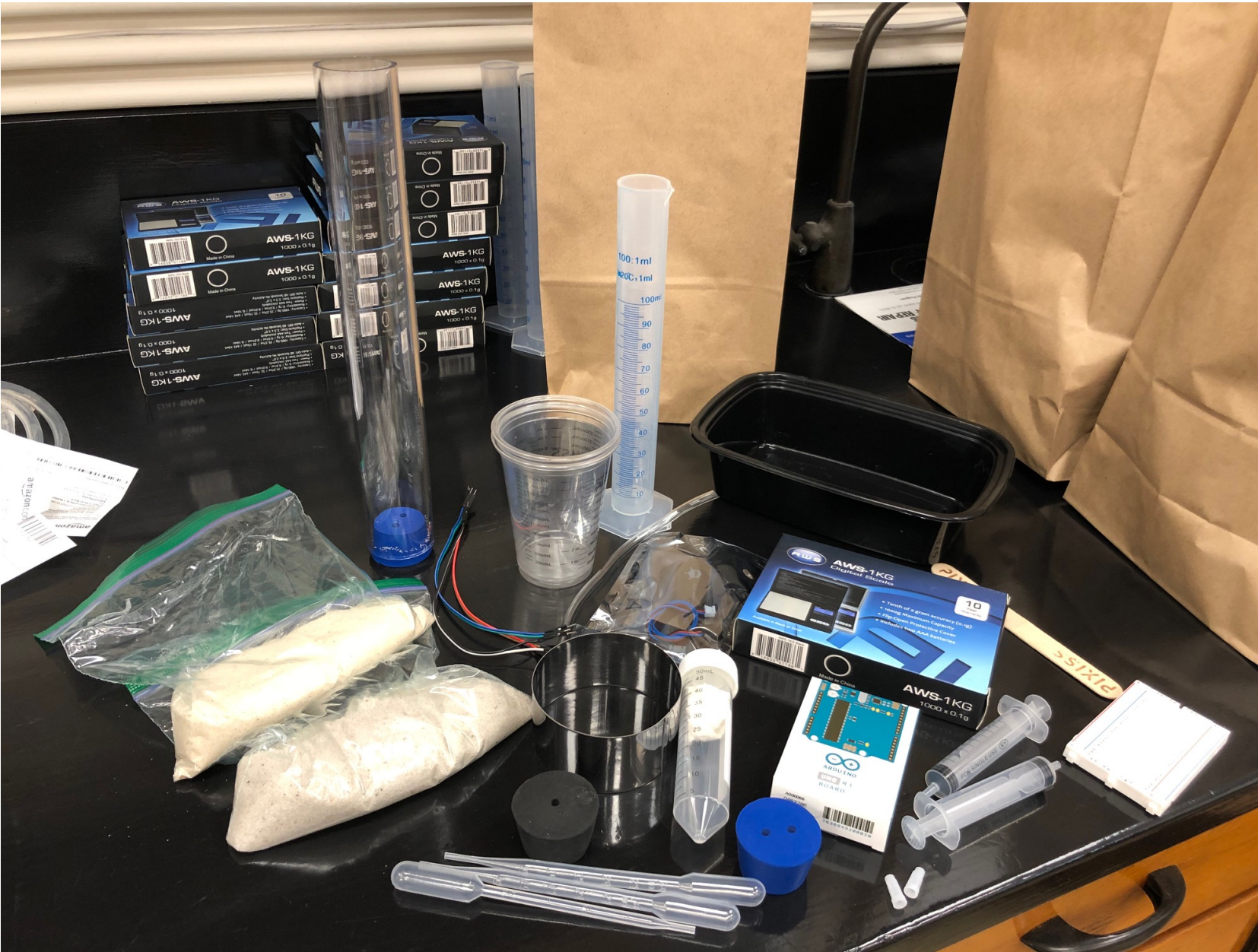
Course re-structuring:

Electronics and circuitry is a completely new concept to my students

Which circuits are good or bad

Fix a circuit

My Challenge



**SSC107:
Soil Physics
October-December 2020**

*if you can't bring students to the
lab, maybe you can bring the lab to
students*

My Challenge



**SSC107:
Soil Physics
October-December 2020**

*if you can't bring students to the
lab, maybe you can bring the lab to
students*

General Lessons Learned

For educators:

- *Students are under huge stress (and who isn't):* show flexibility and consider inclusive methods;
- *There is no “one-size-fits-all” magic solution:* what works for me doesn't have to work for you;
- *It takes more time, that is a fact and you have to live with it:* this one applies to all of us!
- *Don't fight it, embrace it:* think long-term, this may linger. It is worth it, every second of it
- *Think outside the box:* if you can't bring students to the lab, maybe you can bring the lab to students
- *Exchange ideas with colleagues:* create a culture of idea exchange and discuss improving your teaching methods with others
- *Listen to and learn from your colleagues:* they are not bragging or highlighting your weaknesses, but rather sharing their success stories

General Lessons Learned

For students:

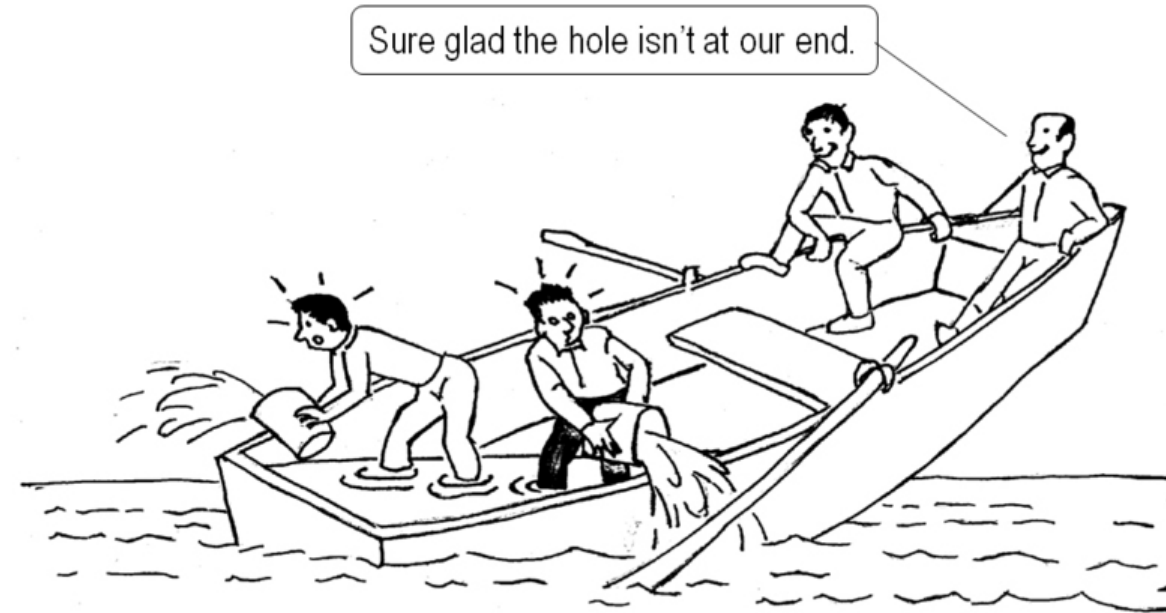
- *It takes two to tango:* help your professors and TAs, this is new to all of us
- *Those are uncharted territories in teaching:* we are not magician and we don't have better internet or tools
- *Educators too are under huge stress:* we are working hard and still experimenting, show appreciation and give courteous feedback
- *Help your colleagues:* if you get it, help others do

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Source: <https://www.pinterest.com/pin/87468417742916674/>

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