Environmental technologies and technical skills track (3 modules)

**Module C-1 - Teaching environmentalism & outdoor education, advocacy (traditional classroom vs non-traditional/non-profit)**

- **Guides:** Jemima Clark, STEM Educator & Coordinator, CES; E. Counihan, Coordinator of Secondary Education, Education Department; K. Livie and B. Ford, CES
- **Schedule:** September 2-27, meetings are either MWF 9:00-10:00 am OR MWF 3:00-4:00 pm (you may choose the slot that best fits your schedule)
- **Cost:** $250 (discounted to $100 for Class of 2020; for all others, 20% for 5 or more modules)

Being an environmental educator is not only a unique opportunity to broaden the horizons of future generations, but is often a crucial first step in a career in environmentalism and non-profit work. Environmental education is essential to introducing young minds to the wonders of the world around them in an engaging, experiential way! This module will demonstrate how to transform traditional “field trips” into meaningful experiences, with a focus on student action. We will utilize best practices from both formal and non-formal educational settings- with the goal of designing immersive experiences that are aligned to curricular standards.

1) Non-formal & formal env ed in Maryland
2) Who are the main players: NAAEE/MAEOE/CBP/CB Agreement
3) State standards for Environmental Literacy
   a. Revision 2020
   b. Action Projects=MWEEs
4) Meaningful Watershed Educational Experience & Action Projects
5) Next Generation Science Standards Alignment
6) Environmental public programming for k-12
   a. understanding STEM, STEAM and non-traditional education for env
   b. immersive educational practices
7) Environmental public programming for adults and volunteers (Livie)

**Module C-2 - Water Quality**

- **Guides:** Dr. Doug Levin, Chief Innovation Officer, CES; M. Menke, Water Quality Technician, CES; B. Ford, CES
- **Schedule:** October 5-23, meetings Monday & Wednesday 2:00-3:30 pm
- **Cost:** $250 (discounted to $100 for Class of 2020; for all others, 20% for 5 or more modules)

In this module, participants will explore the principles and practical application of water quality testing. This includes familiarity with calibration, set up, repair and deployment of professional grade water quality measurement systems used to monitor water quality in freshwater, brackish and marine environments. You will learn how to set system requirements, assess sampling frequency, and determine the spatial strategy for deployed buoy systems. We also will examine some of the many potential uses for these systems and their data, from modeling water health and developing models for TMDLs to uses in habitat restoration and aquaculture.
Although this is an online course, hands-on field opportunities (optional) to use some of these instruments will be scheduled when conditions allow (at no extra cost), even if that is months away.

1) Principles – Why water quality?
2) Weather and Water Quality
3) Parameters to Measure
4) Spatial and Temporal Measurements
5) Sonde Education Calibration & Sample Set up
6) Buoy Construction, System Integration & Deployment
7) Data Telemetry, Data Visualization, Data Analysis
8) Use the Chester River Watershed Observatory as an example and learning opportunity

NOTES: In Situ, a corporate partner, has a training curriculum for their instruments
JLS to contact faculty...

Module C-3 - Remote Sensing – Tools to Look Below the Surface
The last few years have seen a revolution in technologies that allow us to see into places that were formerly hard to reach or essentially invisible – these “remote sensing” techniques are now being used in a remarkable array of jobs, with amazing results. This module explores some of the most important technologies, looking first at where they might be useful and then at how they are used.

Although this is an online course, hands-on field opportunities (optional) to use some of these instruments will be scheduled when conditions allow (at no extra cost), even if that is months away.

1) Principles & approaches
   a. Environmental research
   b. Geomorphology
   c. Benthic habitats
   d. Habitat restoration
   e. Aquaculture
   f. Archaeology and cultural resource management
   g. Regulatory compliance

2) Methods
   a. Sidescan sonar
   b. Other acoustics
      i. Fathometer
      ii. Sub-bottom
      iii. ASCS (acoustic seabed classification systems)
   c. Magnetometry
   d. Radar
   e. Other instruments
   f. Satellites, aircraft, and drones
   g. Lidar

3) Position-fixing, mapping
   a. Principles
   b. Conventional mapping and position fixing
   c. Global positioning systems

4) Survey design and execution

5) Reporting