NHV/EPICS Combo Course

**BACKGROUND**
- Common core for all students, transfers included
- NHV: 1 semester composition course using science and engineering ethics for its content
- EPICS: 1 semester design process and professional skills course that uses an open-ended problem for its content

**CHANGE**
- WHY?: Integrate the NHV and EPICS learning outcomes, so they are mutually reinforcing by identifying and strengthening complementary content.
  - Natural opportunities to complement content from each course
- “Neurons that fire together, wire together”

**LEARNING OUTCOMES**
1. Identify and compare their own and others’ biases and values through written reflection.
2. Work through an iterative process of drafting and revision to produce clear summaries, comparisons, and analyses of texts.
3. Apply specific ethical theories to current and past debates on the environmental and social impact of engineering and science.
4. Construct logical and convincing arguments supported by appropriate sources and evidence using written, visual, oral, and graphical communication.
5. Apply creative and critical thinking skills to create an engineering solution using a guided design methodology that meets specifications.
6. Utilize decision analysis methods to compare and evaluate design alternatives to select the most desirable option taking into account ethical perspectives.
7. Identify and improve on personal areas of difficulty related to professional skills such as writing, presentation, and constructive criticism through collaboration with team members and self-reflection.
8. Engage with the challenge of understanding and solving complex open-ended problems in their environmental and social contexts.
9. Communicate relevant design ideas through the use of standardization engineering graphics conventions as applied to engineering sketching and computer-aided design (CAD) software.

**EXAMPLE TASK**
- **Task: Stakeholder perspectives and negotiation strategies**
  - **Out of class**
    - Write the three most important stakeholders and explain why these are the most important.
  - **In class**
    - Students are put into groups with one assigned stakeholder per group
      - Discuss and write responses that identify stakeholder ideal outcomes and means for achieving and reasons for desiring these outcomes.
    - Split into new groups with at least two different stakeholders represented
      - Discuss and write responses that compare and contrast matching and competing interests, assess likelihood of each stakeholder achieving their desired outcome, and then suggest strategy for negotiation.
    - **Reflection:** Each group shares strategies with the larger class, then the whole group discusses how these strategies connect with other problems and relate to other contexts.

**Foundation for...**
- **NHV**
- **EPICS**
- **TECH CLASS**
- **SENIOR DESIGN**
- **THIRD YEAR**
- **HUMAN SYSTEMS**
- **EPICS 2**

**OUR CHANGE:**
Combine courses in order to deepen and expand the complexity of the design process while using design projects as context for ethical exploration, writing, analysis, and research.

**Melanie Brandt, Teaching Assistant Professor, LAIS:** Melanie has taught at CSM since 2011. She is excited about integrating the humanities with STEM fields of study in innovative ways that bolster and enhance learning experiences for students.

**Greg Rulifson, PhD, P.E., Teaching Assistant Professor, LAIS:** Greg has been with Mines only since 2015, and is continuing to work in the broad area of education for socially responsible engineering through this integrated course and the Humanitarian Engineering Program. He has learned quickly that the CSM students are a motivating force for great teaching after seeing their amazing potential to be leaders in the U.S. and abroad.

June 2016 Cohort