Signature First-Year Experiences: Creating a distinctive first-year experience in- and out-of-the classroom

Sam Spiegel, PhD, Trefny Center
Colin Terry, CASA
Core curriculum committee

GEEN 101: Earth Systems

Learning Outcomes
- Cover Earth Science through a systems approach
- Investigate details of the geosphere, hydrosphere, atmosphere, and biosphere and their interconnections
- Understand how human activities influence the environment

Teaching Structure
- Three 1 hr lectures per week
- Fall / Spring / Summer
- 150 max in lecture

Program Collaborations
- EPIC151 - 1st year Design EPICS

PHGN 100: Mechanics

Learning Outcomes
- Apply appropriate fundamental principles of kinematics, dynamics, energetics, and momentum to analyze and interpret mechanical phenomena
- Apply appropriate conservation laws to analyze and interpret mechanical phenomena
- Communicate fluently with the vocabulary of mechanics
- Interpret physical phenomena portrayed by and appropriately translate between by different representations
- Design, perform, analyze and interpret experimental results
- Carefully read, analyze and make sense of written documents
- Recognize the role of physics in engineering, research and your everyday world
- Appreciate the role and value of interactions with peers, TAs and instructors in learning
- Believe that you can learn difficult concepts through repeated exposure and practice

Teaching Structure
- Two lectures and two studios
- Fall / Spring / Summer II
- 150 max in lectures / 108 max in studios
- Two 50 minute lectures and two 1 hour 50 minute studios per week
- Two professors in charge of 4 lecture sections
- Three professors and 30 UG TAs in charge of 5 studio sections

Course Sequencing
- Translational kinematics & dynamics with vector calculus
- Rotational kinematics & dynamics with vector calculus
- Energy and Momentum in translation and rotation
- Waves
- Pre-requisite: Calculus I / Co-requisite: Calculus II
- Core requirement for all students

Student Course Workload
- Roughly 4 hours per week for out-of-class reading, homework, and study
- Three 1.5 hr common-hour exams during the semester
- Students spend 6 hours per week in class (not included)
- > 80 hours per week of out-of-class resources – OHs, HW help, CASA Tutoring & CSI

Key Features
- Group learning
- Hands-on
- Scaffolded problem solving
- Context analysis
- Representations
- Sketching
- Labeling
- Diagramming
- System identification
- Application of principles
- Experimental skills development
- Context analysis
- Objective identification
- Representations
- Prediction and Modelling
- Data analysis and interpretation
- Error analysis
- Mathematical communication

Introduce and provide environment to facilitate movement from novice to expert in problem solving and experimental skills

COLORADO SCHOOL OF MINES
1. Reduce/eliminate sources of frustration for students in our curriculum
2. Improve the active learning and hands-on nature
3. Improve and deepen relationships in first year
4. Improve integration of the educational experience
5. Make potential pathways and majors easily visible
Learning across their college experiences
Learning across their college experiences at Mines
Learning across their college experiences

Learning across their experiences at Mines

Program learning outcomes
Learning across their college experiences

Learning across their experiences at Mines

Program learning outcomes

Program learning outcomes
Learning across their college experiences at Mines

Program learning outcomes

COURSE AAA
COURSE BBB
COURSE AAA
COURSE AAA
COURSE BBB
COURSE CCC
COURSE BBB
COURSE DDD
COURSE DDD
COURSE DDD
Learning across their college experiences

Learning across their experiences at Mines

Program learning outcomes

COURSE AAA
COURSE AAA
COURSE AAA
COURSE BBB
COURSE BBB
COURSE BBB
COURSE CCC
COURSE CCC
COURSE CCC
COURSE DDD
COURSE DDD
COURSE DDD

Study abroad

Club

REU

COLORADO SCHOOL OF MINES
Learning across their college experiences

Learning across their experiences at Mines

Program learning outcomes

COURSE AAA
COURSE AAA
COURSE AAA
COURSE BBB
COURSE BBB
COURSE BBB
COURSE CCC
COURSE CCC
COURSE CCC
COURSE DDD
COURSE DDD
COURSE DDD

COLORADO SCHOOL OF MINES
Learning across their college experiences

Learning across their experiences at Mines

Program learning outcomes

COURSE AAA → COURSE BBB → COURSE CCC → COURSE DDD

Trefny I^2 Center for Innovative Instruction
Let’s focus on YEAR 1

- What are the experiences and/or outcomes we want for all students in year 1?

- How can we create and support the richest learning opportunities for first-year students?
What if we built it as a single course?

- Brainstorming session:
  - Just to think about what might we want out of 1st year (not getting bogged down into single content areas)
- A single year one course design to focus outcomes and coherence
- A single out-of-class experience design
- Define as a foundation to build to major or graduation: Not isolated experience
Work in small groups

Have a recorder who will write or type the top 5 points/ideas of the discussion. Represent the whole group.

- What are the experiences and/or outcomes we want for all students in year 1?

- How can we create and support the richest learning opportunities for first-year students?
Contact us to follow up

- Colin Terry – cttery@mines.edu

- Sam Spiegel – sspiegel@mines.edu