

From: [Yosef Allam](#)
To: [Faculty Senate](#)
Subject: Expression of Interest: Cornerstone Design I (EDNS151) Two-Semester Conversion
Date: Monday, November 2, 2020 9:26:47 PM
Attachments: [Cornerstone Design I EDNS151 Two-Semester Conversion Summary.docx](#)

Dear Senators,

Attached, please find a summary of approximately 200 words located in the middle of the page of the attached document (denoted with a header). Surrounding text is optional reading, added as a supplement.

Thank you!

Best,

-Yosef

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Cornerstone Design I EDNS151 Two-Semester Conversion

Background

The Cornerstone Design@Mines Program features Design I (EDNS151), a first-year and Core course with studio and lab components in which students gain abilities and experience in creative, open-ended, human-centered, iterative design through a team-based, term-length design project with wicked-hard problem spaces which vary by semester. In addition to the open-ended design project, students also develop skills to add to their professional “toolbox” in areas such as stakeholder engagement, collaboration and feedback, sketching, technical written, oral, and visual communication, value, risk, idea generation, decision making tools, Excel, CAD, hands-on workshop skills, prototyping, modeling, scholarly and authoritative research, among other professional skills.

Summary (200 words)

We propose developing and piloting, subject to Senior Leadership and Core Curriculum Committee support for sustainable expansion and administration, a two-semester version of Design I to both augment and refine Design I. The new version would move the current term-length design project addressing global and community problems to a second semester; the hands-on lab where students build fundamental skills for their academic and professional careers remains in the first semester. Key features are a new studio in Semester 1 that would address a variety of introductory discipline-specific, skills-specific, and community engagement outcomes through weekly experiential, problem-based, hands-on collaborative learning, with a focus on connecting incoming students to Mines@150 priorities, an exploration of possibilities for first-year students for further engagement in initiatives and programs, as well as adding professional and disciplinary breadth to all future Mines graduates. Outcomes and skills are applied from the first to the second semester for a richer and more project-focused design experience, with increased emphasis on the design process and more depth and development of solutions, more opportunity to integrate the lessons of the first semester to develop concepts, build, validate, iterate, refine, and realize. Semester 2 of the labs includes weekly sessions addressing data analysis and visualization through programming. The table below summarizes the two-semester model for EDNS151, with new components highlighted.

Motivation and Further Details

More specifically, the proposed two-semester Design I conversion addresses Mines@150 and 2019-20 Core Curriculum Committee priorities by incorporating hands-on, problem-based mini-sprints in leadership, business, engineering economics, entrepreneurship, creativity, technical and professional communication, campus community engagement, and exposure to the variety of disciplines of study offered at Mines. Weekly discipline-specific learning activities would be developed by guest curriculum developers from units outside of the EDS Division, perhaps alumni, and result in cross-disciplinary and cross-unit relationship development and collaboration. Faculty representatives from other units would be able to promote their areas of study and programs. From this breadth offered to all students, students may be able to select areas of engagement during their time at Mines. The new Semester 1 studio and Semester 2 lab directly address Core Curriculum Committee findings from 2019-20 (and institutional leadership direction to the committee) of a need to include more professional awareness and community engagement, professional and fundamental skills, breadth, and data analysis.

Design I EDNS151 Two-Semester Conversion (new topic sequence for illustrative purposes only; new items are highlighted)				
Semester 1			Semester 2	
Week	Studio (new)	Lab (previous or similar to previous)	Week	Studio (previous or similar to previous)
1	Traditional degree programs (ME, CivE, ChemE, EE, earth extraction, ...)	Spatial Visualization & Technical Sketching1	1	Intro, Team Mini-Challenge
2	Traditional degree programs (ME, CivE, ChemE, EE, earth extraction, ...)	Field Sketching	2	Problem Identification, Stakeholders, CFP
3	Traditional degree programs (ME, CivE, ChemE, EE, earth extraction, ...)	Soft Workshop	3	Teams, Problem Definition
4	Traditional degree programs (ME, CivE, ChemE, EE, earth extraction, ...)	Hard Workshop	4	Empathy
5	Traditional degree programs (ME, CivE, ChemE, EE, earth extraction, ...)	Hard Workshop	5	Idea Generation
6	Traditional degree programs (ME, CivE, ChemE, EE, earth extraction, ...)	Technical Sketching2	6	Decision-making tools & Concept Prototypes
7	Arduino & prototyping with microcontrollers	Excel1	7	Concept Presentations
8	3D Printing / additive fabrication methods vs traditional subtractive and assembly methods	Excel2	8	Peer Evaluation
9	Leadership	CAD (SW)1	9	Subsystems
10	Creativity	CAD (SW)2	10	Technical Writing
11	Business Acumen	CAD (SW)3	11	Project Development & Update
12	Engineering Economics	CAD (SW)4	12	Project Development & Update
13	Entrepreneurial Concepts/Skills	CAD (SW)5	13	Risk & Mitigation
14	Library & Research (scholarly & authoritative) with good sources, critical thinking	Working Drawings & Design Documentation	14	Costs, Benefits, Value Proposition
15	Campus community integration and involvement	Certified SolidWorks Associate (CSWA) Exam (OPTIONAL)	15	Proof-of-Function Prototypes
16	Technical Communication norms & audience- and format-appropriate expectations (throughout via periodic content-specific assignments)		16	Final Presentation, Design Competition, Final Report

Data analysis, data visualization, mathematical modeling with programming in MATLAB, Excel/Visual Basic, etc.