

Dean's Racial Justice Curriculum Challenge (WIP)

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Dean's Racial Justice Curriculum Challenge (WIP)

The College of Engineering (COE) Dean's Racial Justice Curriculum Challenge tasks all faculty in the college to use their engineering problem-solving skills to develop creative ways to incorporate issues of diversity, equity, inclusion, (DEI), racial justice (RJ), and social justice (SJ) in every class we teach. The challenge was inspired by our students, who requested a greater connection between the technical content of classes and real world SJ issues, including the role that engineers play. The intent is to engage faculty in the development of new curriculum while providing a mechanism for direct student feedback on new ideas. Success was measured by the level of engagement of faculty in the challenge.

A Call to Action

In Spring 2019, a small group of diverse students requested that more social justice and applied problem solving be included in the curriculum. They organized and led the Engineering Mindfulness in Climate and Curriculum (EMC²), a group of faculty, administrators, and students with the goal of affecting change in our engineering community, classroom, and curriculum by incorporating inclusivity principles and connecting with social good. The murder of George Floyd in May 2020 and resulting international focus on DEI issues reverberated strongly across campus. The collective outcry for change served as a flashpoint in the college for immediate action to embed DEI into our curriculum. A critical component was the teaming of the Assistant Dean of DEI, Associate Dean of Research, and faculty members to push the initiative.

DEI, RJ, and SJ are fundamental parts of engineering design decisions and impacts engineers have on society. These topics are rarely offered as electives that are specific to engineering education and are not formalized as part of the COE curriculum. It was proposed that these should be part of the core engineering technical curriculum, rather than separate topics without context of analysis or the design process. An example used as guidance was an ASEE paper entitled "From Sacred Cow to Dairy Cow" [1]. Several classes in the college were already implementing concepts of DEI, RJ and SJ into the curriculum by a variety of methods, whether individual lesson plans, projects, or re-evaluating messaging and terminology used. The intent of the Dean's RJ Curriculum Challenge (CC) was to formalize a program to empower and engage faculty in modifying their own curriculum, to highlight those who took these initiatives, and to promote discussions among faculty. Our key marker of success is the level of faculty engagement.

The Program

The program rollout for **Fall 2020** included a series of email announcements, starting in July 2020, along with personal appeals to Department Heads and Department DEI Committees to promote the challenge among the faculty and other instructors in each department. The call was open ended, requesting that faculty submit at least one lesson plan incorporating these ideas for at least one class they were teaching. The submittal required the following: class impacted, proposed lesson plan, objectives, instructor preparation, student preparation, outline of the activities or lectures, and student deliverables. Submittals could include a lesson plan made previously, a modification to an existing plan, a new plan, or a proposed change to the class for the following time it would be taught. The intent was to be broad to elicit engagement by faculty at any level they were prepared for, realizing that the sudden move to on-line instruction,

pandemic, and local, national, and international focus on DEI discussion were providing multiple challenges on their own. However, these forces were requiring instructors to re-think their curriculum choices, so it was also an ideal time to seed other areas where curriculum could be improved.

Each plan was reviewed by a team of 3 to 5 students, recruited from officers of the student chapters of our affinity-based engineering professional organizations, the leadership of our other COE student society and design teams, our Allies for Equity groups, students enrolled in two DEI and SJ focused COE courses, and participants in COE DEI reading groups. Interested students attended a virtual orientation run by the COE DEI Office to discuss the reviewing criteria and intent.

The specific process was as follows. Submissions were encouraged every week, with a Thursday 5 pm deadline. Each Friday, student reviewers were assigned submissions aligned with their major/year and asked to return a completed feedback form by Monday evaluating:

- Cultural sensitivity/appropriateness – was there anything in the lesson plan which might be offensive or presented in the wrong vein?
- What was particularly compelling or impactful about the lesson?
- What suggestions did they have for how the lesson could be improved?
- Was the lesson plan ready to implement, or should updates be made and reviewed?

All reviews were done via shared on-line folders. Each Monday morning the reviews were compiled. Faculty received qualitative feedback from the reviews along with a recommendation of “ready to implement”, “ready to implement with minor adjustment, no need for further review”, or “would like to review again after adjustments.” Each Tuesday, an email was sent to the entire college noting the number of submissions from each department cumulatively and for the week. In addition, one or two lessons were highlighted, and faculty were reminded to consider submitting on Thursday. A database of the highlighted lessons was compiled and posted on a shared faculty/Dean’s Office drive for others to peruse and get ideas for other classes.

A goal for **Spring 2021** was to improve the quality of feedback on submitted lessons. Since the student reviewers were primarily undergraduates, while they were able to provide excellent input on how the class would be received, they found it difficult to evaluate lesson plans for pedagogy, realistic implementation goals, and likely effectiveness. In addition, the weekend timeline for reviewing limited the quality of time spent on the review. To address some of these issues, in Spring 2021 submissions were accepted on a rolling basis but lessons were only reviewed three times during the semester. Graduate students were added to the review panel to provide their perspective. All submissions were shared with college faculty.

Some supportive activities were initiated. The Department of Civil and Environmental Engineering DEI committee hosted two “brainstorming sessions” led by faculty who had submitted to the CC. Faculty members met to discuss pedagogy, hear of others incorporation of DEI, RJ, or SJ content, and discuss content of their own classes to flesh out ideas for submittal. Several ideas developed in these sessions were submitted, and others were implemented without official submission because the instructor thought they were too similar to other submissions or not significantly transformative. The College DEI Office invited Juan Lucena to give two webinars to help faculty develop lesson plans, which led to specific discussions and submittals.

These further discussions and curriculum changes indicate a wider impact and faculty engagement than the official submission count.

In AY 2020-21, we officially received 67 lesson plans from 45 faculty members, impacting 52 courses. Several courses included more than one RJ themed lesson during the semester. Participation rates were higher in Fall 2020 but varied across departments, as shown in Table 1. The classes included 3 first year, 10 sophomore, 12 junior, 8 senior, 12 senior/graduate, and 9 graduate level classes.

	BME	CEE	ChemE	ECE	MIE	Writing
Fall 2020	33%	7%	61%	15%	26%	0%
Spring 2021	83%	14%	26%	0%	5%	33%

Biomedical Engineering (BME), Civil and Environmental Engineering (CEE), Chemical Engineering (ChemE), Electrical and Computer Engineering (ECE), Mechanical and Industrial Engineering (MIE), Junior Year Writing

In **Fall 2021** we added a second challenge, the Inclusive Design challenge. The college convened two working sessions for faculty across the departments to share and support each other in developing lesson plans. The submission and review process was reassessed, returning to weekly submissions. The goal was to have many potential reviewers “on call” from each department, who would participate based on the type of submissions each week. Each review committee included undergraduate and graduate students as well as faculty. Reviewers were asked to meet during a ~1.5-hour time frame on Friday afternoons to read and discuss each lesson as part of their review. We received 8 submissions from 4 faculty members and 3 graduate student teaching fellows impacting 9 classes.

There may be several reasons for the diminished submissions. First, the ongoing challenges of the pandemic likely reduced the time available for modifications to classes and lesson planning. Another factor is that most faculty submitting in the previous year were still trying out these plans and modifying them rather than coming up with new submissions. Finally, there was a specific push to get faculty who had not yet submitted to participate. This had the unintended effect of implying that faculty should not submit if they had already participated.

The CC process is being revised for **Spring 2022** to improve responsiveness and dissemination of goals and lesson plans throughout the COE. Data will be collected from those faculty who submitted plans to provide feedback on what they found effective and whether they continued these or other related activities in future semesters. Faculty responses will be used to gain insight into whether pre-lesson perceived benefits aligned with faculty post-assessments.

Overall Impact

A wide range of approaches were taken by faculty to include RJ, SJ, and/or DEI in their technical courses. The most prevalent approach was to leverage case studies and design examples to foster reflection and discussion. Formats included in-class and online group forums and breakouts, presentations, open-ended short homework responses, literature reviews, formal essays, and informal self-reflections. Some assignments asked students to think deeply about impacts of designs, technology, and facility placement, others challenged students to think about community engagement and communication strategies for different groups, and others engaged students in data analysis assignments and projects. Some assignments asked students to rewrite a textbook problem including a SJ context.

The CC has been particularly impactful on the students involved. Lessons that resonated with them the most incorporated DEI concepts directly into what was being taught in the class – pointing to existing flaws and biases related to class topics and asking students to discuss potential technical and social solutions. Their engagement helped foster community:

“I appreciated not only seeing such concrete proof of the COE’s commitment to DEI issues but being a part of them as well. It was refreshing and deeply meaningful to me to be asked my own opinion ….” – Biomedical Engineering senior

“.... As someone who hopes to become a professor one day, this was an excellent learning experience to see a variety of ideas and methods for creating inclusive engineering pedagogy and to be able to critically examine and revise lesson plans being mindful of SJ and RJ.” – Environmental & Water Resources Graduate Student

“As a student reviewer it was very empowering to be able to assist in the development and presentation of DEI content in our classrooms...The best lesson plans were ones where I felt equally immersed in the DEI content as I did in the technical curriculum...” – Biomedical Engineering senior

“I hope these discussions continue to drive the UMass COE community to question themselves sincerely, support each other with kindness, and grow not just as engineers, but as human beings. Engineers have the ability to make a lot of change in the world, and thus should be informed about what the world is to them.” – COE alumna and founding member, EMC²

Over three semesters, the CC has inspired 46 faculty (33% of the College) and 3 graduate students to submit 75 lesson plans covering 58 courses throughout the COE. A broad mix of faculty have participated, including across level (Lecturer, Assistant, Associate, and Full Professors), gender, and ethnicity. Discussions with faculty indicate other courses were modified by the goals of the CC but not officially submitted. While there have been diminishing returns in the second year, this may be a natural progression. Future iterations will (1) aim to obtain submissions from those that have not yet submitted; and (2) reinforce the incentive to submit additional lesson plans. We will collect post-implementation feedback from faculty and review the pre and post evaluations to see if lesson plans were retained in subsequent semesters and evaluate effectiveness of lesson plans.

The original objective of EMC² was fluid - it was an effort to get conversations going, connect students with faculty members, and foster growth for students and professors alike. While EMC² began as a small group of students yearning for more depth in the engineering curriculum, through the Dean’s RJ Curriculum Challenge it evolved into an organized method of reaching out to faculty and encouraging real change in lesson plans.

[1] Lucena, J. C., & Leydens, J. A. (2015), *From Sacred Cow to Dairy Cow: Challenges and Opportunities in Integrating of Social Justice in Engineering Science Courses* Paper presented at 2015 ASEE Annual Conference & Exposition, Seattle, Washington. 10.18260/p.24143