2012-13 MIU Report of Impact and Accountability
Wisconsin Collaboratory for Enhanced Learning (WisCEL)

John Booske, Chris Carlson-Dakes, Shirin Malekpour, Sarah Mason, Eric Osthoff, Shawn Peters, Suzanne Smith, Barry VanVeen

Data and Analysis provided by:
Clare Huhn, Office of the Provost, Academic Planning and Institutional Research

7/1/2013
General program update
WisCEL is a complex project involving multiple units on campus - College of Engineering, College of Letters and Science, College of Agriculture and Life Science, School of Business, Division of Information Technology, General Library System, and the Office of the CIO. WisCEL employs a collaborative funding and operational model, faculty and staff input, new uses for technology and space, and instructional and learning innovation. Each WisCEL Center combines multi-functional spaces, functional and mobile furnishings, and over 100 computers, with enhanced instructional technologies and new pedagogies to create student-centered learning environments that synergistically serve both formal and informal learning.

WisCEL Centers at H.C. White College Library and Kurt F. Wendt Commons opened in November 2011. The Centers operate within existing libraries creating a partnership that leverages prime university space towards 24X7 usage. The two WisCEL Centers, officially began hosting courses spring semester 2012, and have just completed their third semester of operation.

Following are highlights of the impact the Madison Initiative for Undergraduates (MIU) support has had on the WisCEL initiative:

Capacity and Enrollment Growth
Since its inception, WisCEL has grown from a pilot with selected Math and Engineering courses to a program serving more than 3000 students, 29 courses, and working with 30 instructors in 15 departments which span four UW-Madison divisions – College of Letters and Science, College of Engineering, School of Business, and the College of Agricultural and Life Sciences.

- **Enrollment Growth**
  - **Academic Year 2011-2012**: Nearly 1000 students enrolled in 21 pilot sections of Math and Engineering courses.
  - **Academic Year 2012-2013**: More than 2300 students enrolled in 81 course and/or discussion sections, taught by 23 different instructors. WisCEL also hosted additional course activities: 14 discussion sections, 5 instructor office hour sections, 8 “study table” sessions, and 6 “lab” sessions on a weekly basis. For a complete list of WisCEL courses see the list at the end of this report.
  - **Academic Year 2013-2014**: Of the 16 courses and 52 sections scheduled for Fall 2013, 4 courses are new, and 12 are returning. Of the 12 returning courses, 8 have requested to increase the enrollment capacity from previous semesters.

- **Course Capacity Growth**: In Spring 2012 WisCEL had two courses with capacities of 100 or more with an average course size of 65 students. In Fall 2012 the average course size was 85, and 4 courses had capacities 100 students or more. By Fall 2013 WisCEL anticipates an average course size of 120, with 7 courses of 100 or more students.

Student Learning and Achievement Outcomes
- The majority of WisCEL courses saw a significant increase in the percentage of students attaining a mastery-level grade of B or better and saw a decrease in the percentage of students with adverse outcomes (a grade of D or F or Drop).
- 2012-2013 WisCEL Pre-Calculus courses (Math 95, 101 and 112) enrolled mostly freshman, of whom approximately 17% were targeted minority (TM) students. Prior to Fall 2012, there was a persistent achievement gap between TM students and the non-TM students. An analysis of Math 112 outcomes revealed that the grade gap closed significantly in the Fall 2012 WisCEL Math 112 course.
The analysis showed that among new freshmen, TM students’ performance matched that of non-TM students. Approximately 60% of each population received a grade B or better and TM students had lower rates of adverse results (grade of D, F or Drop) than non-TM students.

### Instructional Improvement

- In 2012-2013, WisCEL supported 23 courses which employed a wide variety of new course designs and innovative instructional strategies and technologies. Instructional approaches included blended learning, flipped instruction, active learning and hybrid models (courses that alternated class meetings between WisCEL and other settings).
- WisCEL instructional strategies and models benefited student learning through student-centered, personalized instruction which:
  - Addressed diverse backgrounds and learning needs
  - Developed learners’ content and conceptual mastery
  - Increased instructor and student interaction
  - Used immediate feedback, greater time-on-task, an emphasis on problem-solving and self-paced strategies
  - Developed skills in peer collaboration and teamwork
  - Supported formal and informal learning opportunities
  - Enhanced technology access for learning in and out of class
- Of the 30 different instructors who have held a course to date in WisCEL, all but 2 have re-applied to hold the same course or additional courses in WisCEL in subsequent semesters. WisCEL instructors report that while re-designing a course for WisCEL often takes up to 3 semesters, it is worth the work and they now prefer teaching in WisCEL and believe they are delivering higher quality instruction and students are learning more.
- WisCEL instructors supplement their formal course instruction through instructor- and TA-facilitated after-class office hours, study tables, lab hours and independent informal study held in WisCEL. Providing extended timely, expert feedback and support of this kind in WisCEL allows students to sustain in-depth learning about challenging problems. Students find it is more convenient to use such help when provided in WisCEL, than in Instructor’s offices. They feel more comfortable interacting individually with instructors in WisCEL than in instructor’s offices.

### Best practices in instructional design, staging, and classroom pedagogy

- Integration of on-line course content and materials, course management, technologies, and space.
- Use of “flipped” instructional models that reconfigure student work in- versus out-of-class.
- Use of WisCEL facilities for courses that exploit WisCEL’s technology and/or physical space.
- Use of individual and group incentives that reinforce preparation for class and completion of tasks.
- Emphasizing mastery learning over norm-referenced evaluation.
- Use of longer class periods (i.e., two sessions of 75 minutes with sustained learner engagement and contiguous time-on-task) over more frequent short periods (i.e., three separate 50-minute sessions).
- Use of TAs and SAs to improve student-to-instructor ratios.
- Use of computer scoring of student work to provide immediate feedback and reduce grading time.
- Schedule office hours/study tables in WisCEL to increase instructor contact time with students.
- Small group collaboration, which benefits the learning of all students.
- Use of short, highly focused online lecturelettes to introduce basic concepts and prepare students for in-class activities.
- Use of in-class exercises and instructor-learner interaction that probe for conceptual understanding and expose misconceptions which impede student progress.
Impact of WisCEL on project-specific goals
WisCEL project-specific MIU goals are to:
1. Compare grades and evaluative assessments in WisCEL and non-WisCEL course sections. WisCEL class sections will result in equal or better student outcomes.
2. Make qualitative observations on what works and what does not work in the WisCEL spaces.
3. Accumulate and report on data relevant to educational best practices.

WisCEL MIU Goal 1 (Equal or better outcomes in WisCEL versions of courses)
Finding: The majority of WisCEL courses saw an increase in the percentage of students attaining a mastery-level grade of B or better and saw a decrease in the percentage of students with adverse outcomes (a grade of D or F or Drop).

Using data provided by the Academic Planning and Institutional Research (APIR) office, an analysis was conducted comparing student outcomes in 13 courses held WisCEL in Fall 2012 and Spring 2013. Outcomes from each WisCEL course were compared to prior semesters of the same course taught in a traditional classroom setting for up to eight semesters (Fall 2008 – Spring 2012). Two types of outcomes were considered to determine if WisCEL courses met the goal of producing equal or better outcomes: 1) the percentage of students who received a grade of B or better in the course; and 2) the percentage of students who received a grade of D or F, or who dropped the course. The analysis produced the following outcomes:

Increases in % of students with grades B or Better
• 9 of 13 WisCEL courses examined had 80% or more of students attaining a grade of B or better.
• 11 of 13 WisCEL courses offered Fall and/or Spring (2012-2013) attained increases in the percentage of students who received a grade of B or better as compared to previous semesters.

Decreases in % of students with grades D, F or Drop
• 12 of 13 WisCEL courses in Spring 2012, Fall 2012 and Spring 2013 had substantially lower percentages of students receiving a grade of D, F or who dropped the course compared to the same courses offered in traditional settings in the previous 4 semesters.
• Engineering courses saw the biggest decreases in DF/Drops in WisCEL courses over traditional courses. The percentage of students receiving a DF/Drop declined by 9% in CEE 330; 11% in ECE 431; 7% in ECE 230; 9% in MSE 351; 10% in NE 271; 18% in ECE 352; 19% in EPD 690; and 25% in NE 506.

WisCEL MIU Goal 2 (What does/does not work in WisCEL space)
Finding: What works and what does not work for the WisCEL program as a whole and in the classroom are highly interdependent. Strong program leadership and management foster successful instructional innovation and feedback from instructors informs WisCEL staff about further valuable support strategies.

Practices that work well in WisCEL include:
• Informal and formal learning opportunities. Using WisCEL space and technology to foster extensive student collaboration in class leads to the formation of student friendships founded on shared academic interests, and these informal groups frequently see WisCEL as the venue of choice for studying. The combination of formal and informal learning is increasingly resulting in the facilities being used at capacity throughout its extensive hours of operation.
• **Flexible furniture fosters interaction.** The pod arrangement in WisCEL facilities fosters timely, intensive interaction between instructors with individuals or small groups of students. Rolling chairs enable flexible, dynamic student collaboration, especially in pairs and trios.

• **Course management technology optimizes teaching and learning.** Using technology for course management optimizes overall learning by ensuring that students come to class ready to utilize the expert assistance of instructors to apply basic concepts to real world-relevant problems and questions. The “flipped” instructional model that many WisCEL instructors are using depends on technology to structure student learning in preparation for and subsequent to classroom work.

• **Program support focuses on teaching and learning.** Essential logistical, technical, and instructional support (e.g., scheduling, software and hardware installation, Help Desk staffing, video lecture production) provided by WisCEL operational staff, Wendt and College library staff, and UW technology and teaching and learning services allows instructors to focus on teaching and learning.

• **Limiting lecturing and whole class discussion.** Limiting if not eliminating lecturing and whole class discussion in WisCEL with classes approaching 30 or more students.

• **Effective integration of Teaching Assistants (TAs) and undergraduate Student Assistants (SAs).** TAs and SAs reduce the student-to-instructor ratio and increase face-to-face interaction between students and instructors. TAs can also assist instructors by managing computerized exercises, exams, quizzes, and scoring, freeing instructors to work directly with students.

• **Leadership, coordination and support.** WisCEL is successfully evolving from course and facility piloting to more coordinated and consistent operations and instructional implementation. A committed cohort of early adopter instructors has been attracted and retained due to the belief of program leadership that all courses and instructors have unique attributes to which WisCEL support services and facilities must be tailored for optimum success.

**Practices that do not work well in WisCEL include:**

• **Lectures and large class discussion are hampered by poor visibility.** WisCEL main rooms do not provide good visibility for lecture-style presentations. Whole class discussion and small group work in WisCEL works best when students can view information displays (whiteboards, wall monitors, overheads, computer monitors) from any seat and when students’ sight lines to one another are unobstructed. The main rooms in WisCEL centers were not designed to support large-class lecture.

**WisCEL MIU Goal 3 (Educational best practices)**

**Finding:** An evaluation of WisCEL in 2012-2013 shows that best practices at the course or classroom level fall into three interrelated areas: Instructional Design, Course Staging, and Classroom Pedagogy. Instructors vary in how well they meet their own high standards of quality and efficacy relative to each dimension the first time they offer a course. Virtually all instructors make substantial adjustments the second or third time they teach a WisCEL course based on lessons learned about what did or did not work well previously.

Below are best practices for the three dimensions of WisCEL course design and delivery.

**Instructional Design:** (i.e., the scope and conceptual flow of course content).

• **Selective and careful development and use of course content, software, course management tools and web-based materials.** Parsing out and sequencing content for pre-class preparation, lessons for active classroom learning, and developing related homework and assessments requires consideration and refinement.

• **Use of “flipped” instructional models to reconfigure the work done by students in- versus out-of-class.** Flipped instructional models in WisCEL often use web-based content (e.g., instructor-
produced video lecturettes) and other resources to introduce basic concepts prior to class, and place the focus in class on the application of content and concepts to real world problems or questions.

- **Iterative integration of technologies, space, resources and strategies.** Two or more iterations of a course are needed to refine instructional activities based on initial experimentation with the new strategies made possible by WisCEL’s unique technology and physical layout.

**Staging:** (e.g., rules and procedures related to attendance, assignments, feedback and grading, and the selection of and strategies for using a WisCEL spaces and technology).

- Use of WisCEL facilities for formal instruction only for courses and classes that directly exploit WisCEL’s unique technology or physical space.
- Create incentives that underscore and reinforce the importance of assigned tasks and content.
- Use of computer scoring of student work to provide immediate feedback while freeing instructors to focus on helping students with the most cognitively challenging content and tasks.
- Use of course management tools and other means to frequently monitor student attendance, task completion and understanding in and out of the WisCEL classroom.
- Emphasize mastery learning over norm-referenced evaluation criteria.
- Use longer class periods (i.e., 75 minutes or more) over more frequent short ones (i.e., 50 minutes).
- Maximize the average amount of student contact time with instructors by using TA and SAs where available to reduce student-to-instructor ratios.
- Schedule ample time between WisCEL classes to facilitate extended interaction and transition.
- Schedule “office hours” or “study tables” in WisCEL to further increase instructor contact time with students.

**Classroom Pedagogy:** (i.e., instructional strategies and delivery)

- Encourage and foster small group collaboration.
- Organize student groups by shared interests for work on extended projects.
- Provide appropriate group and individual incentives for students to prepare for class and complete work.
- Use short, highly focused lecturettes (5 to 15 minutes) delivered online to introduce basic concepts and prepare students to succeed with in-class work.
- Limit the amount of time students must devote to learning about software and technology except when such learning is an express goal.
- Use in-class interaction to probe for conceptual understanding and to surface misconceptions that impede student progress.
- Encourage or require and incentivize collaboration, which benefits the learning of students with a history of lower performance without compromising the progress or course satisfaction of high performing students.

**Impact of the WisCEL project on the general MIU goals**

WisCEL project-specific goals include accumulating and reporting data on educational best practices, utilizing technology to enhance student learning, and the support of peer collaboration and other high-impact pedagogies. These goals directly support MIU goal #3 which states: “Expand best practices and innovation in teaching and learning, curricular design, and student services in order to enhance undergraduate student learning and their educational experience”. The following highlights and summary statement address the impact of WisCEL on MIU goals.
Teaching and Learning

Finding: In 2012-2013, WisCEL supported 25 courses which employed a wide variety of new course designs and innovative instructional strategies and technologies. Instructional approaches included those known as blended learning, flipped instruction, active learning and hybrid models by instructors and faculty. These instructional models benefited student learning through student-centered, personalized instruction which: 1) addressed diverse backgrounds and learning needs, 2) developed content and conceptual mastery, 3) increased instructor and student interaction, 4) used strategies such as immediate feedback, time-on-task, problem-solving and self-pacing, 5) increased skills in peer collaboration and teamwork, 6) supported formal and informal learning opportunities, and 7) enhanced technology access for learning in and out of class.

Several WisCEL instructors conducted their own teaching research and reflection and disseminated their results through reports, conference presentations, online and through articles in national publications. Below are four different examples from WisCEL instructors in 2012-13:

Math 112 Fall Semester Grade Report, Shirin Malekpour. Math 95, 101, and 112 coordinators attribute the success of the WisCEL math courses to the blended learning approach and instructional strategies used in each course since Spring 2012. Their blended approach allowed TA instructors to focus and condense problem-solving demonstrations, give students more time-on-task doing homework with the software in-class, and increase instructor and student interaction which supported individual learning needs and provided immediate and frequent feedback. The WisCEL Math “mastery” approach required students to attain at least an 80% score on their homework assignments before accessing the quiz. Also significant to the Math WisCEL courses was the Math Coordinator’s training of the TA instructors, and customization of the Pearson online curricula, course management features, supplemental materials and assessments to the blended instructional model.

2013 ASEE Annual Conference, “Leadership Development in Tight Times: Scaling up courses without watering them down,” Chris Carlson-Dakes. The paper and presentation on the challenges to teaching undergraduate leadership development, features the curricular model Carlson-Dakes designed for his WisCEL INTEREGR 103 course which included new pedagogical strategies, essential learning outcomes (ELO) and high impact practices (HIP) that were applied to a small group learning community. Student survey results indicated that one of the most important elements of the course was the interaction with instructors and student interns that helped them learn course content and get quick responses to questions. In the paper, Carlson-Dakes also provided insights into challenges facing similar courses: 1) scaling up (increasing and diversifying enrollment and curriculum), 2) maintaining quality of learning (improving pedagogical framework and rigor for all students), and 3) lessons-learned (engaging in teaching as a research endeavor, nurturing campus and community partnerships, balancing tradition and diverse contemporary needs, making the “large feel small,” and ongoing commitment). Lastly, he discusses recommendations for other institutions seeking to adapt similar course reforms.

Diverse Students Go Digital, The Chronicle of Higher Education, June 19, 2013, Shawn F Peters. See: http://chronicle.com/article/Diverse-Students-Go-Digital/139645/. Shawn F Peters, lecturer in the Liberal Studies and the Arts Department, has held his ILS 275 course in WisCEL for three semesters. His article highlights how the opportunity to teach in the WisCEL space has afforded him new ways to teach with enhanced technology in a collaboration-friendly learning space that encourages active learning and fosters a sense of belonging, especially for students from diverse backgrounds. He credits the success of his ILS 275 course to doing away with “the shortcomings of lectures courses,” by giving students a
greater role in discussion and interaction and ready access to technology, social media, and cyber materials, which serve to build on student’s diverse backgrounds and interests, and promote inclusion and academic engagement.

**Signal Processing Lectures on YouTube**, [http://www.youtube.com/user/allsignalprocessing](http://www.youtube.com/user/allsignalprocessing), Barry Van Veen. This YouTube channel features Khan Academy style mini lectures on signal processing created by Lynn H. Matthias Professor of Electrical and Computer Engineering Barry Van Veen. These lectures were developed for use in two flipped classroom courses, ECE431 and ECE630, offered in WisCEL during the 2012-2013 academic year. The lectures are being widely used on YouTube even though they have only been online since January 2013. For example, in May the channel received 13,700 views and 57,300 minutes - almost 1000 hours - of viewing time. The flipped versions of ECE431 and ECE630 based on these videos were very successful at improving student learning. The mean ECE 431 final exam score increased by 9% relative to that from Professor Van Veen’s three previous offerings of the course.

**Achievement Gap**

**Finding:** A main goal of the MIU is to address the achievement gap found between targeted minority (TM) and non-targeted minority (non-TM) undergraduate students. WisCEL Pre-Calculus courses (Math 95, 101 and 112) are taken mostly by incoming freshman and those students who need to meet their Quantitative A requirement. In 2012-2013 approximately 17% were targeted minority students. Prior to Fall 2012, there was a persistent achievement gap between TM students and the non-TM students. An analysis of Math 112 outcomes revealed that the grade gap closed significantly in the Fall 2012 WisCEL Math 112 course. The analysis showed that among new freshmen, TM student’s performance matched those of non-TM students. Approximately 60% of each population received a grade B or better and TM students had lower rates of adverse results (grade of D, F or Drop) than non-TM students.

Shirin Malekpour, with data provided by Clare Huhn in APIR, prepared a report entitled **Math 112 Fall Semester Grade Report**, which analyzed Math 112 fall semester outcomes over the period 2006-2012, comparing targeted minority and non-targeted minority students grade outcomes. In Fall 2012 the Mathematics department converted all sections of Math 112 (approximately 520 students) into WisCEL based instruction, featuring a student-to-instructor ratio of 24/1, blended learning instructional strategies, trained TA-instructors, individual computers for each student, and customized use of online My Math Lab curricula from Pearson. The analysis of the outcomes grades for freshman students in Math 112 for seven fall semesters (Fall 2006-2012) showed that prior to Fall 2012, there was a persistent achievement gap between targeted minority (TM) students and the non-targeted minority (non-TM) students. The analysis showed that the grade gap closed significantly in the Fall 2012 WisCEL Math 112 course:

- For Fall 2012, among new freshmen, TM student’s performance matched those of non-TM students. Approximately 60% of each population received a grade B or better. Previously, in Fall 2011, only 40% of the TM students earned a grade B or better.
- In Fall 2012, only 11% of new freshman TM students received an adverse result (grade of D, F or Drop) compared to 12% of non-targeted students. The rates of D, F or Drop for all new freshman has declined for the last four years. Prior to Fall 2012, TM students had higher rates of adverse results that non-TM students - in Fall 2012, the trend reversed.

An analysis of Spring 2013 data for Math 112 found similar increases in the number of all students receiving grades of B or better, and similar decreases in the rates of all students receiving grades of D,F
or Drop. However, a similar closing of the achievement gap (between TM and non-TM students) at the low end of the grade distribution was not found, and a corresponding reduction of the gap at the higher end of the grade distribution was not evident in Spring 2013 Math 112. Note: A comparison of the Spring semester’s results to the Fall semester’s results is not recommended as the student cohorts for spring semester Math courses are substantially different than the Fall semester cohorts. A more in-depth analysis of spring and fall outcomes, accounting for the cohort differences, is recommended when course outcomes are available for the 2013-14 academic year.

Unexpected Benefits
- When instructors undertake teaching in WisCEL for the first time they expect student achievement to equal or surpass historical levels. Many instructors have observed higher student performance on exams that are very similar to ones used in the past in non-WisCEL settings. In addition to higher achievement, instructors report that they and their students find enjoyment and gratification in the increased levels of face-to-face interaction afforded by WisCEL. These have been major factors in instructor’s decision to continue to offer WisCEL courses and in determining that the effort required to implement WisCEL courses is justified.
- WisCEL courses on instructional innovation taught by instructors from [Engineering Professional Development], Academic Technology, and DELTA (a program that helps prepare STEM graduate students for teaching) are increasingly being taught in WisCEL. This is yielding valuable synergies between WisCEL and other instructional innovation initiatives.

Summary Statement
WisCEL’s MIU funds provide the core budget for its program, technical support, and operational support staff along with TAs and a WisCEL Pre-Calculus Math Coordinator. As a result, WisCEL, in turn, provides campus with unique, 21st century, teaching and learning environments, resources and methods that improve the teaching and learning of more than 3000 students and 30 instructors in 29 courses in 15 departments spanning four UW-Madison divisions: College of Letters and Science, College of Engineering, School of Business, and the College of Agricultural and Life Sciences.

By enabling and supporting best learning practices such as increased, purposeful time-on-task, individualized immediate feedback (both human and machine), a socialized learning climate and extensive, embedded incentives that sustain student engagement with learning assignments and exercises, a number of learning outcome improvements have been observed in just the first three semesters of operation. These include, but are not limited to:

1. A significant increase in the percentage of students in most WisCEL courses attaining mastery-level grades of B or better and a simultaneous decrease in the percentage of students with adverse outcomes (a grade of D or F or Drop).
2. 2012-2013 WisCEL Pre-Calculus courses (Math 95, 101 and 112) enrolled mostly freshman, of whom approximately 17% were targeted minority (TM) students. Prior to Fall 2012, there was a persistent achievement gap between TM students and the non-TM students. An analysis of Math 112 outcomes revealed that the grade gap closed significantly in the Fall 2012 WisCEL Math 112 course. The analysis showed that among new freshmen, TM students’ performance matched that of non-TM students. Approximately 60% of each population received a grade B or better and TM students had lower rates of adverse results (grade of D, F or Drop) than non-TM students.

- WisCEL Director, John Booske
Appendix: 2011-2013 WisCEL Course List

College of Agricultural and Life Sciences
  Soil Science
    SoilSci/AOS 132, Earth’s Water: Natural Science and Human Use
  Genetics
    Genetics 677, Evolutionary Systems Biology

College of Letters and Science
  Mathematics
    Math 095, Fundamental Mathematical Skill
    Math 101, Intermediate Algebra
    Math 112, Algebra
    Math 198, Directed Study (Summer Collegiate Experience)
  Physics
    Physics 207, General Physics

Integrated Liberal Studies Program
  ILS 275, Narratives: Justice and Equality in America
  ILS 275, Special Topics: Remix and Appropriation in the Western Tradition

Department of Statistics
  Stats 371, Introduction to Applied Statistics in Life Sciences

School of Business
  Actuarial Science, Risk Management & Insurance
    ACTSCI 651, Actuarial Mathematics II

College of Engineering
  Engineering Physics
    EMA 201, Statics
    NE 271, Engineering Problem Solving
    NE 506, Radiation Transport
  Civil and Environmental Engineering
    CEE/GLE 330, Soil Mechanics
  Electrical and Computer Engineering
    ECE 219, Analytical Methods for Electromagnetics Engineering
    ECE 230, Circuit Analysis
    ECE 352, Digital System Fundamentals
    ECE 431, Digital Signal Processing
    ECE 630, Signal Processing
  Engineering Professional Development
    EPD 654, Teaching in Science and Engineering
    EPD 690, Effective Teaching with Technology
    EPD 690, Development: Flipped Classroom
  Material Science Engineering
    MSE 351, Materials Science Structure and Property Relations in Solids
  Interdisciplinary Department
    InterEGR 101, Contemporary Issues in the Engineering Profession
    InterEGR 103, Core Competencies for Engineering Leadership