The CoRe Experience is Committed to “Building The Whole Engineer”.

First-Year Engineering CoRe Experience

2023-2024 Annual Report
Letter from CoRe Interim Director
Dr. Amanda Idema

CoRe Interim Director and Asst. Dean for Undergraduate Studies, College of Engineering, Dr. Amanda Idema welcomes freshmen engineering students to the College

June 15, 2024

Another Memorable Fall Experience: Fall 2023 saw the arrival of another record setting class, with over 1,750 new students starting in engineering. While this active and vibrant group of engineering students gathered, fresh and eager for their MSU journey to begin, we were preparing to say goodbye to an individual largely responsible for their CoRe program experience. After more than 27 years of service to the MSU College of Engineering, CoRe Interim Director and Asst. Dean for Undergraduate Studies, College of Engineering, Dr. Amanda Idema bids farewell to her students as they progress to the next year."

Continued Partnership: Our continued partnership with Consumers Energy and GE Aerospace allowed us to remodel the elevator lobbies in East Wilson Hall. Their generous contributions to the CoRe program led to upgrades on the furnishings, digital displays, and graphic displays. These spaces are popular places for students to gather, collaborate, and study.

Student Welcome at Colloquium: For Fall 2023, we returned to our traditional Annual Engineering Colloquium held at the Breslin Center to welcome incoming engineering students. The Colloquium message was delivered by Jason Wojack. Serving as the SVP of Product Development at Luminar Technologies, he has been one of the driving forces behind their remarkable journey from a startup to a Tier 1 automotive supplier. During his colloquium speech, Jason challenged each student to think big and never give up. Jason stated the following to the incoming class of students, "Never let anyone bring you down. You got to keep going. Focus on what lights a fire inside of you and use that passion to drive your success. Don’t be afraid of the challenges, mistakes, and the setbacks along the way. You must never give up on you!"

At the Colloquium, the Director of Athletic Performance for the Men’s Basketball Team, Dr. Lorenzo Guess, also took center stage. He energized the audience and explained the importance of campus and College resources. He reiterated the value of utilizing resources for maintaining a healthy mind, body and overall success on campus. Campus resources, as stated by Dr. Guess, would prevent students from underperforming or being overburdened by their classroom workloads and burning out. Students tuned in for each message and were also treated to a performance by the MSU Cheer Team and a surprise visit by Sparty. Once the program concluded, they were able to attend a campus community resource fair. Thanks go out to all who participated to make this a successful event.

"Our mission is to ensure the success of first-year students as they progress to the next year."

Design Justice Minor: The Design Justice Minor, a collaboration with the Residential College in the Arts and Humanities, saw its first enrolled students this year. Students in this minor take a series of courses designed to prepare them to address the challenges of global conflict, globalization, climate change, and sustainability with respect to peace building initiatives. We are proud to note our minor is the first at a Big Ten institution.

As we head into Fall, I look forward to another successful academic year together, living, learning, advising, teaching, networking and sharing. I am incredibly grateful for the determination, inclusivity, and tenacity everyone has shown during this past year. I thank you all for your continued support and commitment to our mission to help first-year engineering students succeed and progress to the next year.

Together We Will. Spartans Will.

Amanda Idema, PhD
Interim Director, First-Year Engineering CoRe Experience
Asst Dean for Undergraduate Studies
College of Engineering, Michigan State University
www.egr.msu.edu/core
First-Year Engineering Co-Curricular Highlights

CoRe Big Tech Panel: The Wilson Hall Auditorium filled quickly with undergraduate first and second year undergraduate engineering majors looking to gain insights into the Big Tech Industry. For students like computer science major and CoRe Peer Leader Joel Nataren Moran, the CoRe Big Tech student panel provided first and second year engineering majors with an opportunity to learn about salaries, work-life balance, and company culture along with what a typical work day entailed for a college intern. Peer Leaders and other student leaders in the College of Engineering gathered to present their most recent professional experiences at Google, Amazon, Apple, Meta, and Microsoft. According to Mohamad, a first year student in the audience, “Obviously I’m interested in working for a Big Tech company, and if I got a job I would accept it because of the (pay and the lifestyle). Now after hearing from the panelists, I would accept a job because of the supportive environment and more information about computer programming.”

Student leaders shared details about their Big Tech experiences and the importance of joining student organizations to enhance their interpersonal skills. According to Brandon, student panelist and leader in the College of Engineering, those who work in the software and programming fields are often called upon to interface with clients and teammates. It’s not enough to be skilled at what you do; one needs to know how to effectively communicate with those around them as well. At the end of the presentation, students were eager to stand in line to speak with student leaders to ask additional questions.

Below: Big Tech Panel—student line up after the presentation to interact with College of Engineering Student Leaders

CoRe Professional Mentoring: The mentoring program was a three week program that linked CoRe students with engineering professionals who had also served as former CoRe Peer Leaders. Mentors were business owners and successful leaders in the field of engineering. Students were placed in small mentoring groups with the following objectives: personal and professional development, goal setting, career exploration, skill enhancement, and exploring overcoming challenges. Mentors were asked to foster an environment of open communication and mutual respect during each session. Mentors answered student questions by sharing their personal experiences. By the end of mentoring, students were able to define their personal brand, draft a plan to improve their communication and interpersonal skills, become comfortable with networking, and identify career aspirations.

“Idream of working for a Big Tech company. This panel helped me to get closer to where I want to be.”

Building Community: Experience has taught CoRe that if students feel that they truly matter, they are more likely to participate in their living and learning communities, join study groups, and participate in other experiences beyond the classroom setting. Throughout the year, students were offered an array of engineering academic, social and professional events to attend in the classroom setting. During the year, students were placed in small mentoring groups with the following objectives: personal and professional development, goal setting, career exploration, skill enhancement, and exploring overcoming challenges. Mentors were asked to foster an environment of open communication and mutual respect during each session. Mentors answered student questions by sharing their personal experiences. By the end of mentoring, students were able to define their personal brand, draft a plan to improve their communication and interpersonal skills, become comfortable with networking, and identify career aspirations.

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CoRe Leadership Conference: Build a dynamic leadership experience and they will come! We did just that with the Annual CoRe Student Leadership Conference! Representatives from the FBI, Nissan, General Motors, Walt Disney and First Solar created an executive leadership experience for CoRe students. Participants could attend several conference sessions that helped them to better understand that growth and development are lifelong learning experiences and to realize the need to become a leader who is impactful and accountable. Students were able to take professional photos for their LinkedIn profiles and attend a student organization resource fair.

Conference participants gained an insiders prospective on what it takes to be a successful engineer. They also were able to view confidential blueprints for upcoming productions, products and technology from the executives at the conference. Don’t worry, they were not allowed to take pictures!

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A Big Thank-You! It has been a very busy programming year! Each week students were presented with four CoRe events to attend throughout the entire academic year. Events called for them to step outside of their comfort zones to grow and to explore the possibilities of what a Spartan Engineering Degree could offer, very early during their transition to Michigan State University. CoRe connected students with campus resources and followed up each week to offer additional support. Engineering faculty, staff, CoRe Corporate and community partners worked very hard to create a sense of belonging for our students and helped to jump start their academic and professional development. Thank you to everyone who generously contributed their time and talents to make this a successful academic year!

Top: CoRe students attend a 3D printing information session

Right and Below: CoRe students participate in an annual leadership conference

“CoRe annual report 2023-2024 | 5

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We Are CoRe!

Top: Students leaders with Carmella Davis-King, Co-curricular Director and Dr. Guess, Director of Athletic Performance, MSU

We Are CoRe!

Left: Students work together to build community on the residential floors

Right: Students collaboratively build a wall of encouragement during exam week

Left: Students attend a session on power-posing

Below: Students at an Organization Fair

Top: CoRe Money Matters event

Left: Students at a resource fair

With Gratitude to All

Theme Partners

Project Partners

N BorgWarner

Academic and Co-Curricular Support Employees, Fall 23 and Spring 24

Graduate Teaching Assistants - 22
Academic Tutors - 45
Undergraduate Learning Assistants - 56
Peer and Student Team Leaders - 38
Project and Tech Assistants - 3
First-Year Engineering Academic Highlights

CoRe’s academic program is based on the principle that engagement in meaningful engineering experiences early in students’ undergraduate careers supports their success and persistence to graduation. Through our courses EGR 100: Introduction to Engineering Design and EGR 102: Introduction to Engineering Modeling, we strive to engage students across the disciplines in team-based projects that pique their interests and give them a window into what professional engineering really is. Activities this year focused on engaging with campus and community partners.

EGR 100: An important part of the CoRe Experience is the academic program. EGR 100: Introduction to Engineering Design, is a required course for all incoming first-year engineering students. These students are introduced to the engineering profession and the engineering design process through team-based, interdisciplinary design projects and report writing.

With in-person labs and lectures, additional hands-on design projects were added to the labs, and lecture assignments were conducted using handwritten assignments. For the water filtration design project, students continued to build filtration columns and Red Cedar River water was collected and used for this filtration design project. In addition to this, a new Robotics kit was utilized, due to Lego no longer supporting the Lego EV3 robots for advanced programming and the battlebots competition.

These new robot kits were built, tested, and invented, and a new project design challenge was created that better fit the design of the robots. Students needed to complete a design of the robot that allowed them to collect as many blocks as possible in a two-minute time limit and return them to a collection site in the robot arena.

“I loved the class, and I loved the passion of Dr. Morgan and how willing she was when students needed her help.”

Mini Golf Design Project: A new mini golf design project was beta tested to see if it could be incorporated into one of the main design projects offered. As part of the Mini Golf project, students created an obstacle that a golf ball could travel through, that incorporated a circuit to light multi-colored LEDs in a unique pattern as part of their obstacle. A turn was also included in the obstacle construction, creating more difficulty in getting the golf ball to travel through the obstacle into the Mini Golf hole. Students enjoyed the creativity of this new project, and the challenges that arose for completing the design.

“I really enjoyed Dr. Morgan as a professor. She was knowledgeable of the subject and always willing to answer any questions.”

Adafruit LED Circuit Design Project: Additional improvements were also made to the Adafruit LED circuit design project. More students participated in not only soldering the circuit, but also in sewing circuits using conductive thread into a headband or t-shirt. This allowed teams to design wearable electronics using the circuits. The Heat Exchanger project was also offered again, to give students even more projects to choose from during these semesters. Finally, D2L also continued to be improved in how the course was presented, focusing more on what students needed to accomplish each week, and helping them keep track of the course schedule and prepare for future assignments.

“The professor seemed like she genuinely wanted us to succeed in the class and beyond.”

EGR 100 Projects: In EGR 100 there is a choice of eight projects. These projects are the design of a robot, Adafruit LED circuit design, creating a phone app, 3D printing CAD drawing phone case design, creating a mini golf LED design, design of a water filtration system, design of a mini solar car, and Eli Lilly Drug Manufacturing.

“Professor Morgan made the course very easy to understand.”

Top: MSU President Kevin Guskiewicz visits students and EGR 100 instructor Dr. Jerahvive Morgan on Design Day, Spring 2024

Right: Design a Water Filtration System Project: Schematic of the Water Filtration Filter Design

Below: EGR 100 students test their solar car in the lab
What's New in the Classroom: EGR 102 continues to provide a fun and interactive environment in which students develop foundational modeling, computing and problem-solving skills that will carry them through their engineering career. We do this by creating an environment in which students are constantly challenged with these new skills and work collaboratively on projects throughout the course of the semester. Our two capstone projects offered at the end of the semester are described below.

Project One (Group Project) – Home Solar Techno Scenario Analysis: In this individual project, students sought to perform technical and economic analyses of several scenarios for a home solar installation. To accomplish this, students were given three years worth of solar radiation and temperature data collected from MSU’s enviro-weather station in East Lansing, as well as home electricity use data for a standard east Lansing home. Using this data as well as governing equations for solar panel energy production, students were asked to determine the energy produced and payback period of a solar panel system with varying battery sizes.

What's Coming Next: EGR 102 continues to evolve by seeking out interdepartmental and industry partnerships to sponsor weekly projects, and ensuring that students practice with practical applications of skills and build a network for the future. Over summer 2024, we will also investigate the potential of using other computing platforms in the program.

Professor Smith has been an amazing teacher. He explained things very well and was always happy to help and answer questions. He did a great job of fostering an incredible learning environment and I will STRONGLY recommend him to anyone as a professor and hope to take courses with him again in the future!"

GR 891 - Technical Writing for Engineers and Scientists: Another CoRe initiative was the development and delivery of training programs and program materials for graduate students on teaching and assessing technical writing in College undergraduate courses. Delivery of these materials was through EGR 891, which was taught both in Spring and Fall semester. The course aimed at enhancing the persuasive and expository writing skills of our students, so they could write technical documents clearly, logically, concisely, and accurately.

EGR 891 was very well received by students. They developed a love for writing and learned to communicate their technical knowledge to a global audience and persuade the audience that they had solid experience and expertise which showed promise for their success in future endeavors.

"EGR 891 is excellent. While engineers are not typically known for their writing skills, the course effectively bridges that gap. Additionally, the inclusion of LaTeX enhances the overall value of the class."

The instruction and overwhelming student feedback led to presenting a paper at the American Society for Engineering Education (ASEE)’s FYEE Conference 2022, held in person at Michigan State University.

"One of my favorite courses. I learned actual skills that I NEED in my research. Thank you, Debjani! I hope this course can continue for when my brother begins grad school here at MSU!"

"EGR 891 is an exceptional course, particularly in wide coverage of multiple writing purposes, including statements of work, resumes, mock papers, and cover letters. I am impressed by the detailed feedback provided (assignments), which I could directly apply to enhance my writing skills. This valuable guidance has saved me a significant amount of time, and I sincerely appreciate the dedication and effort put forth by Professor Debjani in creating such a great learning experience."

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Our tutoring service expanded to offer tutoring not only to core courses, but also to college algebra and trigonometry. Our enthusiastic student tutors provided in-person and virtual review sessions before the exams, employing various resources like physical whiteboards, personal tablets, and a projector. These efforts were very well received by the students. We also provided drawing pads and stylus to our tutors to annotate with ease and efficiency. We will continue tutoring and hope to continue growing with renewed challenges.

"I liked the step by step process and that there were different tutors showing how to do the math."

While our focus on student safety, student engagement and success will remain, we will continue our mission to help first-year engineering students succeed and move to the next year. Our Spartans and Spartans Will.

Top: EGR 102 students work on their project in the lab
Right: EGR 102 Student Khang Nguyen and instructor Jason Smith discuss model building assumptions for Khang's final project

Below and Right: Enthusiastic CoRe tutors hold tutoring sessions in CoRe tutoring rooms in Wonders facility
WHO WILL ENGINEER TOMORROW? SPARTANS WILL.

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