The innovations of Design Day on display at MSU Engineering Friday, Dec. 8

Engineering students at Michigan State University have created innovative solutions this semester to enhance the MSU experience on campus, improve mobility for wheelchair athletes, among other needs and will show off their results on Friday, Dec. 8, during Fall Design Day in the MSU College of Engineering.

Fall Design Day runs from 8 a.m. to noon in the Engineering Building, 428 S. Shaw Lane, East Lansing, with awards presented at 1:15 p.m. in Anthony Hall Room 1281. Design Day is free and open to the public.

“Design Day features the creative and innovative abilities of our students and helps us showcase that these Spartan Engineers are ready to enter the engineering profession,” said Wayne Dyksen, Executive Director of Design Day and a Professor of Computer Science and Engineering.

“Student teams present their ideas to their client, defend their ideas before faculty and industry experts, and think on their feet – which is exactly what will be expected of them as they start their careers,” Dyksen added.

This fall’s Design Day incorporates projects from four degree programs and nine courses involving 542 students on 143 teams. The 15-week capstone course, which is required for graduation, provides a platform for students to apply the knowledge and experience gained throughout their engineering education at MSU, Dyksen explained. Working in teams of four or five, seniors put their best efforts into solving real-world problems for big and small companies and present their products at Design Day.

Some of the projects include:
• Spartan Experience App

Students and campus visitors may soon have a mobile app to enhance their MSU experience, thanks to Team Michigan State University Department of Computer Science and Engineering.

Ryan Johnson, Nayana Kodur, Patrick Pale, Roy Perryman, and Scott Swarthout worked together in their senior capstone course, CSE 498, to create the mobile app that they say they actually needed as MSU freshmen.

“SEA provides directions, events, class and sports schedules, building images, parking info – all the navigation details needed to enhance the MSU experience, including telling you where to eat,” Kodur explained.

User’s are alerted to upcoming events and can set a countdown timer for their next class. SEA categorizes menus in each dining hall and can keep users connected with a live Twitter feed.

“We are impressed with the end product, but not surprised that Spartan computer science majors possess both the technical and creative skills to build such a great app,” noted MSU’s Chief Information Officer Rob McCurdy.

The project was created for MSU’s Information Technology Services in partnership with ASMSU and RHS. The Spartan Experience App will now be handed off to ITS’s development team for consideration of university-wide use.

• Inclusive Sports Wheelchair
Standard sports wheelchairs can be difficult to maneuver for athletes with disabilities that impact function in the upper limbs. As a result, there is a need to design universal adaptive sports equipment that accommodates a wider range of disabilities.

A team of five students in Mechanical Engineering 481 worked with Piotr Pasik from MSU’s Adaptive Sports & Recreation Club and Stephen Blosser from the MSU Resource Center for Persons with Disabilities to upgrade equipment to fill the athletes’ request.

“We were looking for a design that would promote inclusion and maximize present levels of physical function,” Pasik explained. “Competitiveness is a human thing. By increasing access to sports participation and physical activity, this design has important implications for our athletes’ quality of life,” he added.

Mechanical engineering seniors Joshua Borton, Ian May, Kristian Rego, Richard Simon, and David York examined ways to accommodate steering and braking when physical limitations exist.

“It took a lot of brainstorming and input from people who will be using the wheelchair,” Rego said. “The open-ended process of interacting with users helped us create and test multiple prototypes, which advanced the project.”

Simon said the interactions with athletes helped the team deal with their initial failures. “It’s what we needed to make the chair so maneuverable. It became a rewarding experience because from day one of testing our prototypes we were able to ask the athletes how to make it fully functional in sports.”

ME faculty advisor Tamara Reid Bush said it was a Design Day project that “just had to work. People are depending on this one,” she said. “Design Day projects are often theoretical and a good source for prototypes. This design is going to be used right out of the gate.”

May said the coolest part was working right on campus. “We got to try our product in real time and got to see athletes using it before we were finished.”

“The needs are easier to comprehend when you are interacting with the customer,” noted Borton.

The Design Day project will be turned over to the Adaptive Sports Club following the addition of a protective bumper to protect the athlete’s legs, York added.

The team was sponsored by the James Dyson Foundation.
• House of Hazards

For insurance agents, understanding and teaching home safety is an important part of the job. A virtual reality game teaches them how to do that.

House of Hazards is a competitive game designed to teach Auto-Owners’ associates about home safety in an immersive, interactive and realistic experience. Using an Oculus Rift Headset, touch controllers and sensors, a player explores a virtual furnished home.

A player is tasked with identifying potential hazards to occupants and property. Players are educated about home safety with a simulation of a realistic everyday home. The game features three difficulty levels and records and displays scores.

It was created by Department of Computer Science and Engineering seniors Matthew Drazin, Frederick Lee, Kevin Nicholai, Kenneth Stewart, and Brian Wong as a project in their senior capstone course, CSE498.

Fall 2017 Design Day by the numbers
• 542 students
• 143 teams

Capstone projects represent:
• 302 students
• 52 teams/sponsored projects
• 38 Michigan-based companies and institutions (73 percent)

Pre-college outreach programming includes:
• 3 schools, plus Women in Engineering
• 146 students in grades 9th-12th
• 17 teachers

Design Day Awards Ceremony: 1:15 p.m., Anthony Hall Room 1281
• 11 awards conferred to top Design Day teams
• Judges include faculty and corporate representatives

Background
• Four undergraduate degree programs represented this fall: Civil and Environmental Engineering, Computer Science and Engineering, Electrical and Computer Engineering, and Mechanical Engineering
• Twice yearly event on last day of each semester (before finals week)
• 24th Year for Design Day (initiated in 1994 by the Department of Mechanical Engineering)

See the team members and their projects in the Fall 2017 Design Day project booklet.

For more information, contact Wayne Dyksen (dyksen@msu.edu) or Jill Bielawski (bielawsk@msu.edu).

Related Website: Design Day December 2017
Communications contact: Patricia Mroczek

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