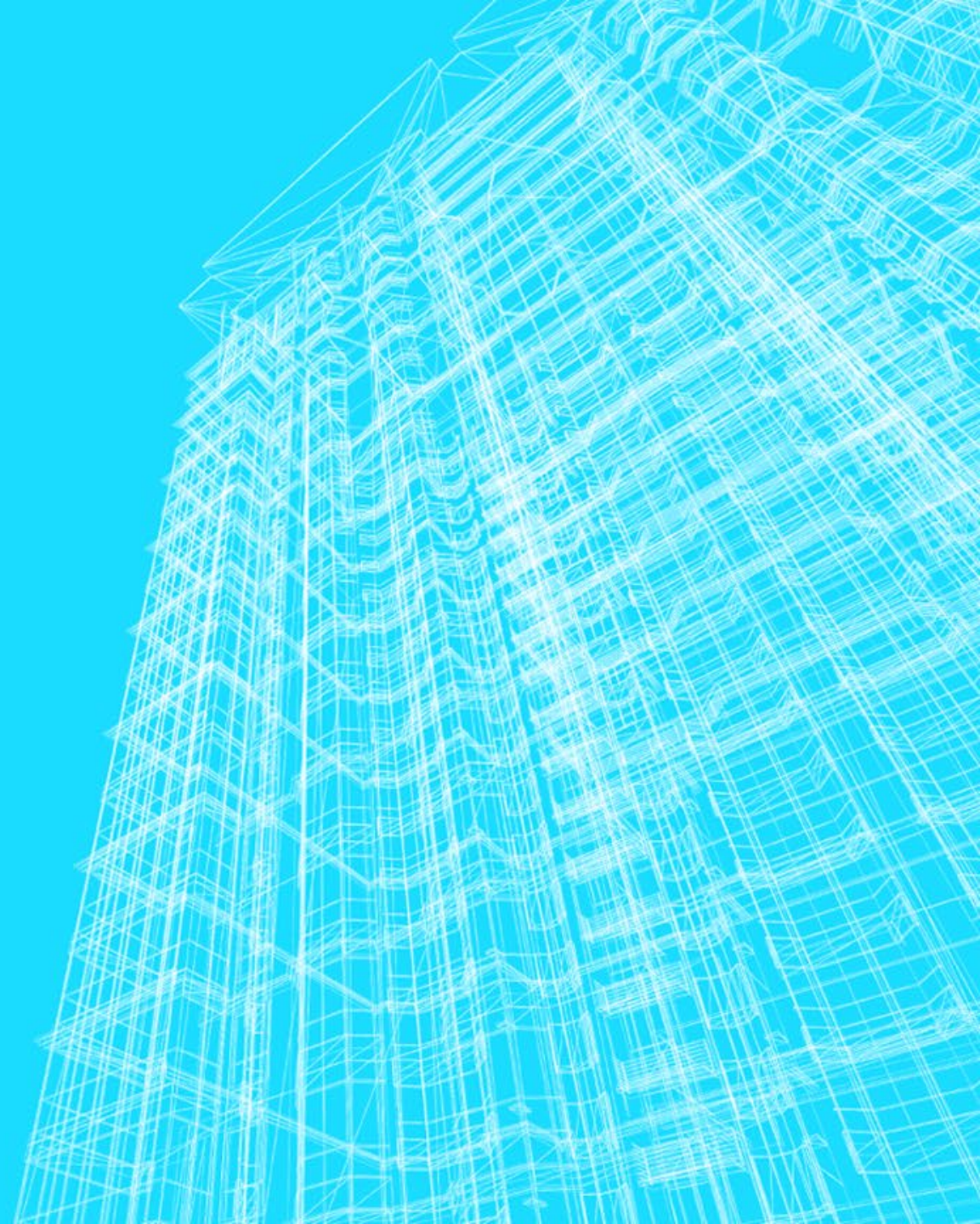
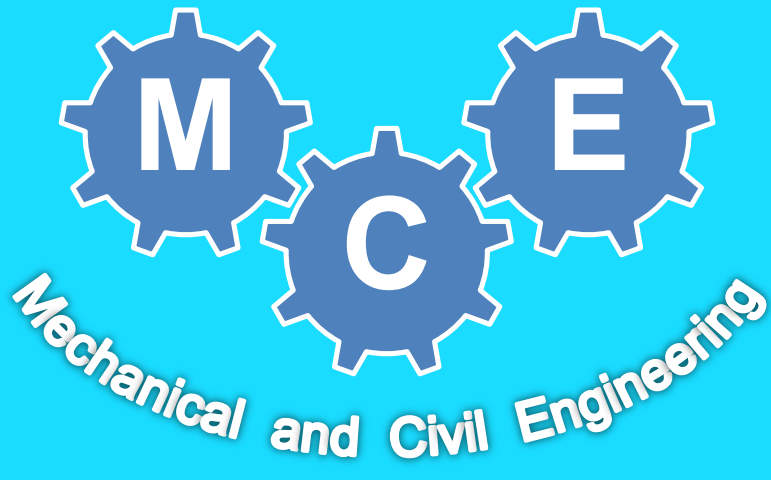


Mechanical and Civil Engineering

An Academy Major



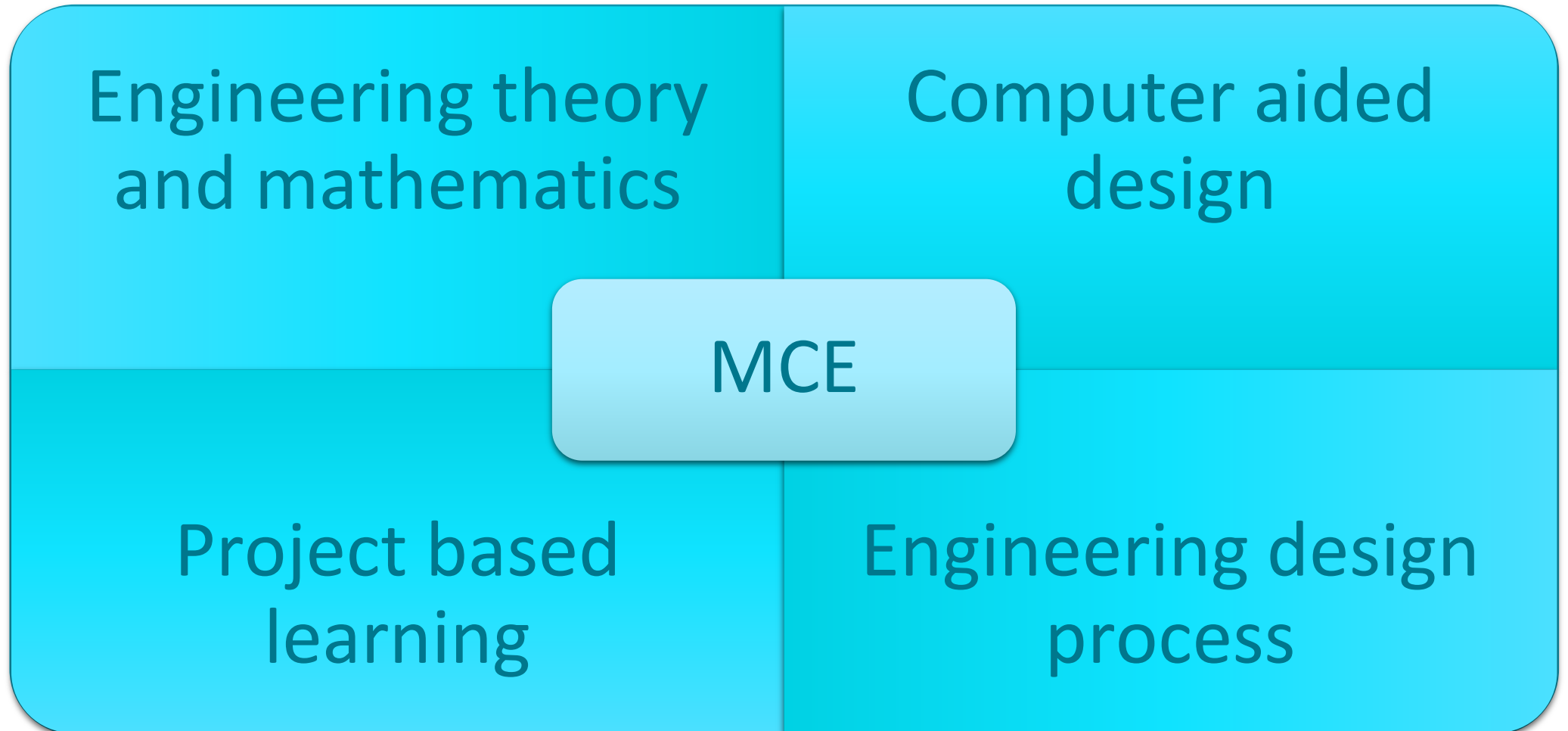
WHAT IS MCE?

The Mechanical & Civil Engineering Program:

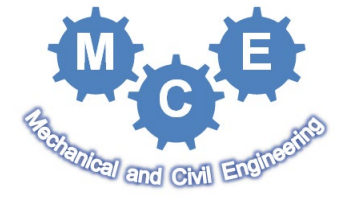
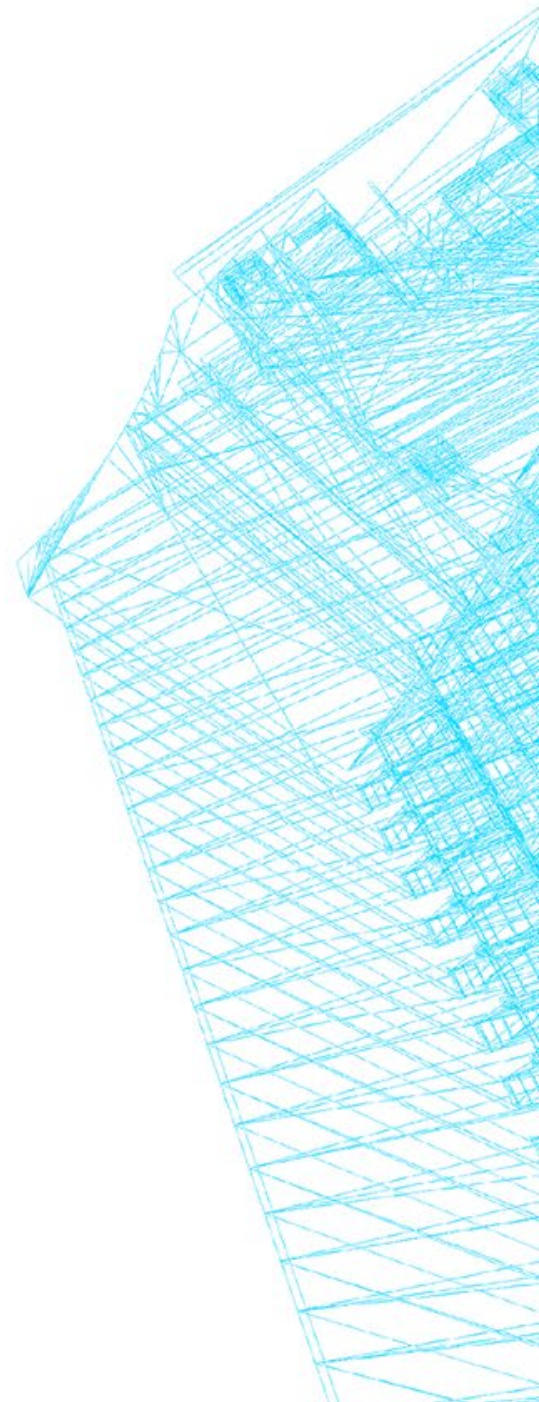
- Develops the skills and knowledge that are prerequisites for success in engineering studies and career development.
- Uses projects as platforms to teach the basics of:
 - Engineering design and development
 - Manufacturing
 - Materials
 - Project planning and management
 - Team dynamics and communications



FOUR AREAS OF LEARNING



ENGINEERING THEORY AND MATHEMATICS



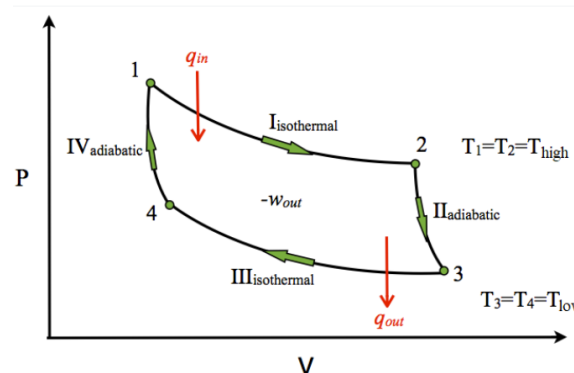
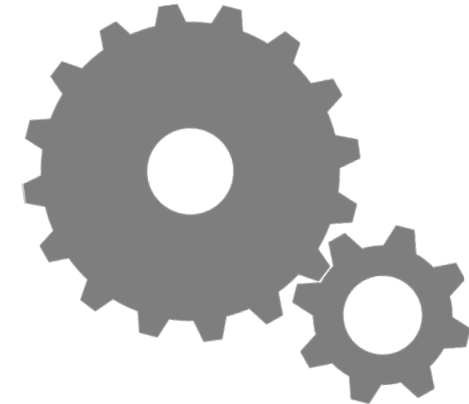
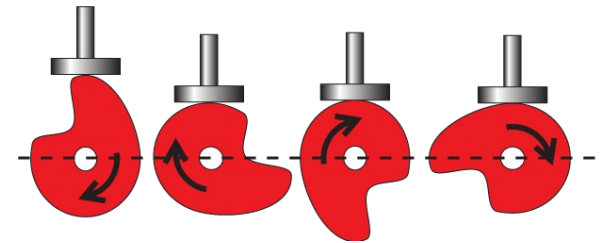
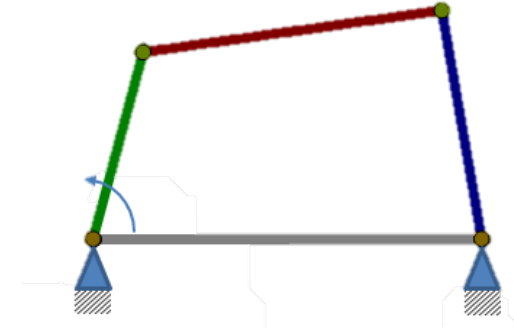
9TH GRADE

- Exploratory – Chance for every student to learn about Mechanical Engineering (MP1 and MP2)
- Engineering tools and language
- Study the forces on everyday structures such as bridges and skyscrapers
 - Linear Stress and Strain
 - Torsional Stress and Strain
- Project Management
- Engineering Design Process
- Simple Machines



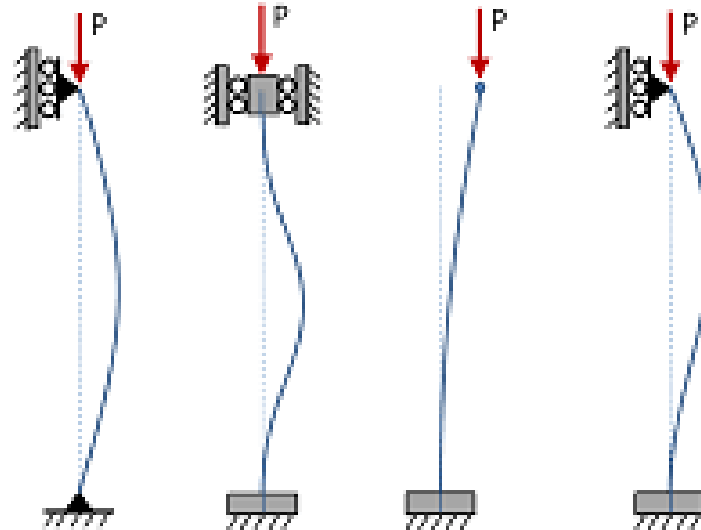
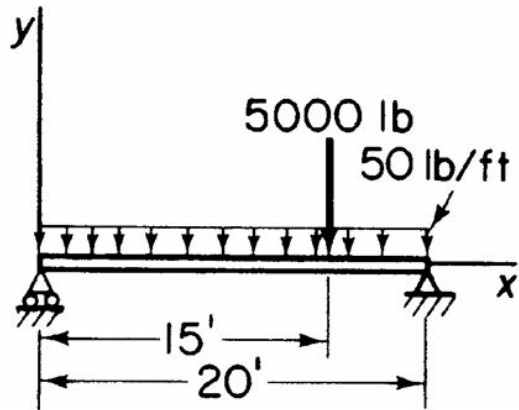
10TH GRADE

- Simple Machines
- Mechanism analysis and design
- Manufacturing Systems - Metal
- Thermodynamics
 - 1st and 2nd laws
 - Heat transfer



11TH GRADE

- Statics – College Credit
- Beam and column analysis
- Manufacturing systems – Plastics



12TH GRADE

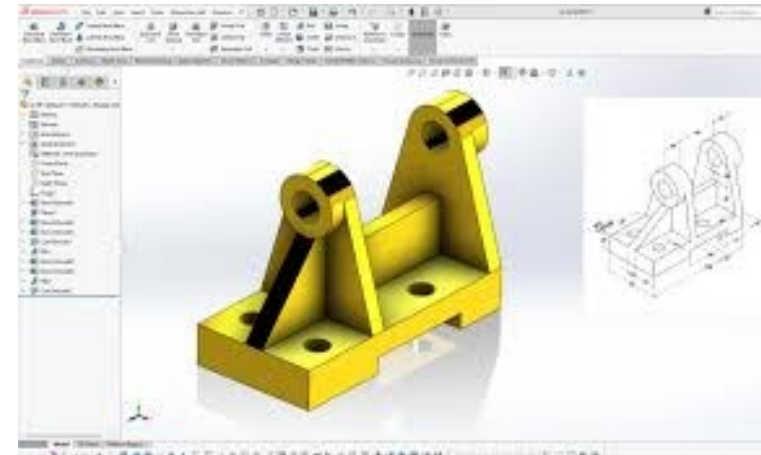
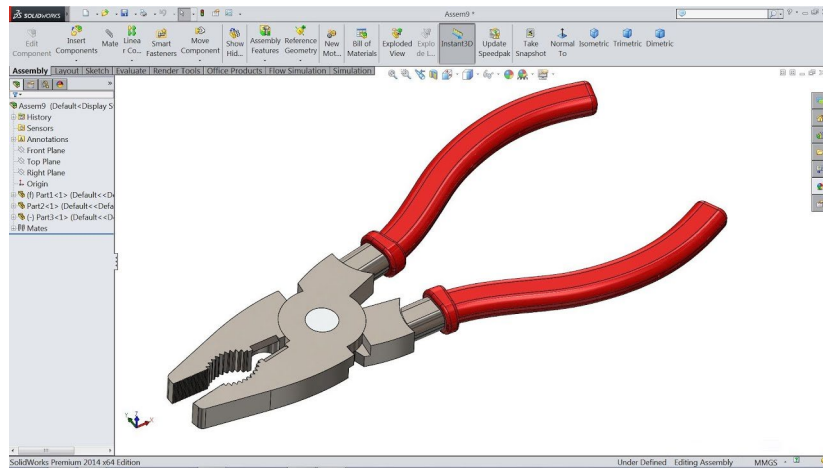
- Self-guided year-long team design project
- Integrate past years' engineering knowledge
 - Engineering design
 - Project planning
 - Stress analysis
 - Mechanism synthesis
 - Manufacturing and Assembly



COMPUTER AIDED DESIGN

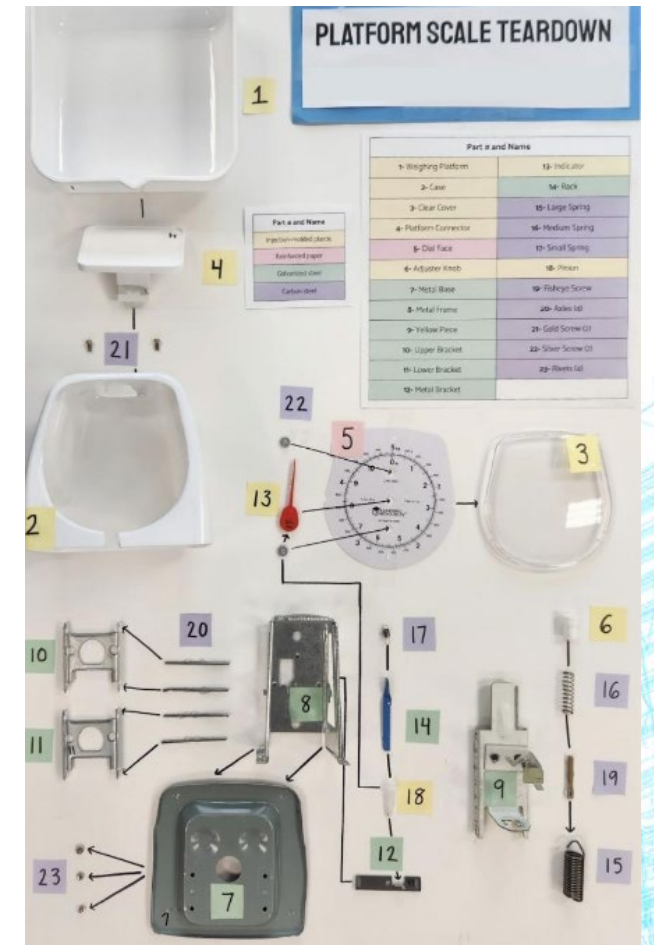
Using Industry leader: SolidWorks

- 9th Grade: Understanding creation of single parts
- 10th and 11th Grade: Expand portfolio during team projects
- 12th Grade: Prototyping and building on CAD



PROJECT BASED LEARNING

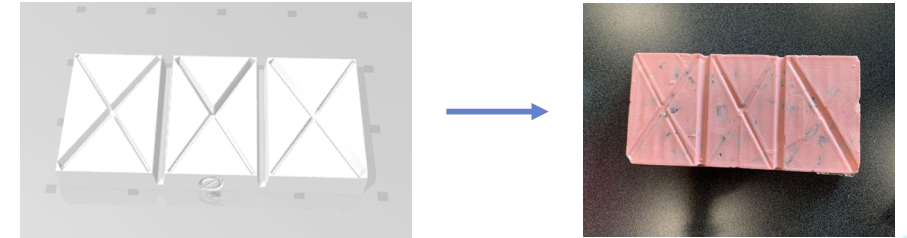
- 9th Grade: Truss Bridges and Buoyancy
- 10th Grade: Mechanisms labs & teardown
- 11th Grade: Statics Labs & teardown
- 12th Grade: Year-long senior capstone project



THE ENGINEERING DESIGN PROCESS

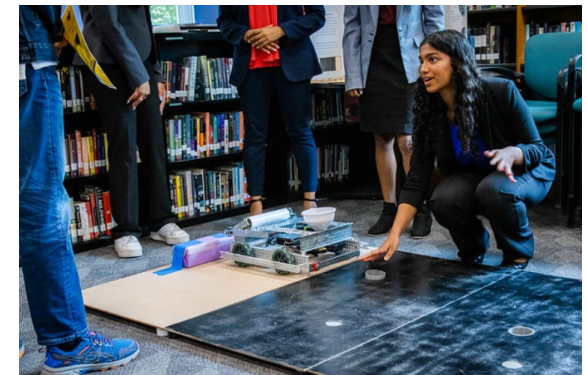
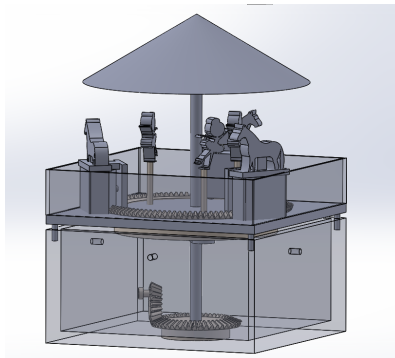
Students engage in real world applications

- Freshmen: Chocolate project
 - Working in teams
- Sophomores: Ball sorter
 - Working in teams with a larger project and subassemblies
- Juniors: Rube Goldberg machine
 - Working in teams with interacting steps
- Seniors: Capstone project



SENIOR CAPSTONE PROJECT

- Incorporates four learning areas into a year-long project
- Aimed to solve a problem or innovate on an existing product
- Demonstrate mastery of key area of MCE
- Senior Showcase – End of the year presentation to students, faculty and other invitees



POPULAR CLUBS FOR MCE STUDENTS

- Mechanical Engineering Design Club
- TSA
- Business clubs
- Academic team
- Artistic clubs
- Musical clubs



Mentorship Program

- Opportunity for students to see engineers at work
- 10 day program within their senior year
- Students work with MCMS coordinator to identify appropriate Mentorships

Some past student mentorships:

- Rutgers Research Internship
- NJIT Research Internship
- NASA
- Government Internships (for Phil Murphy)
- Startup Companies
- Local municipal civil engineering firm



MCE STUDENTS' COLLEGE ACCEPTANCES



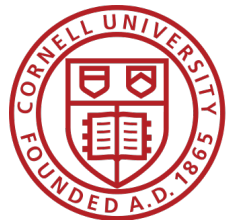
PURDUE
UNIVERSITY.



UNIVERSITY OF ILLINOIS
URBANA-CHAMPAIGN



Berkeley
UNIVERSITY OF CALIFORNIA



PRINCETON
UNIVERSITY

RUTGERS

Honors College | New Brunswick



BROWN

