

GROVE CITY COLLEGE
MECHANICAL ENGINEERING
PROSPECTIVE INFORMATION
2025 – 2026



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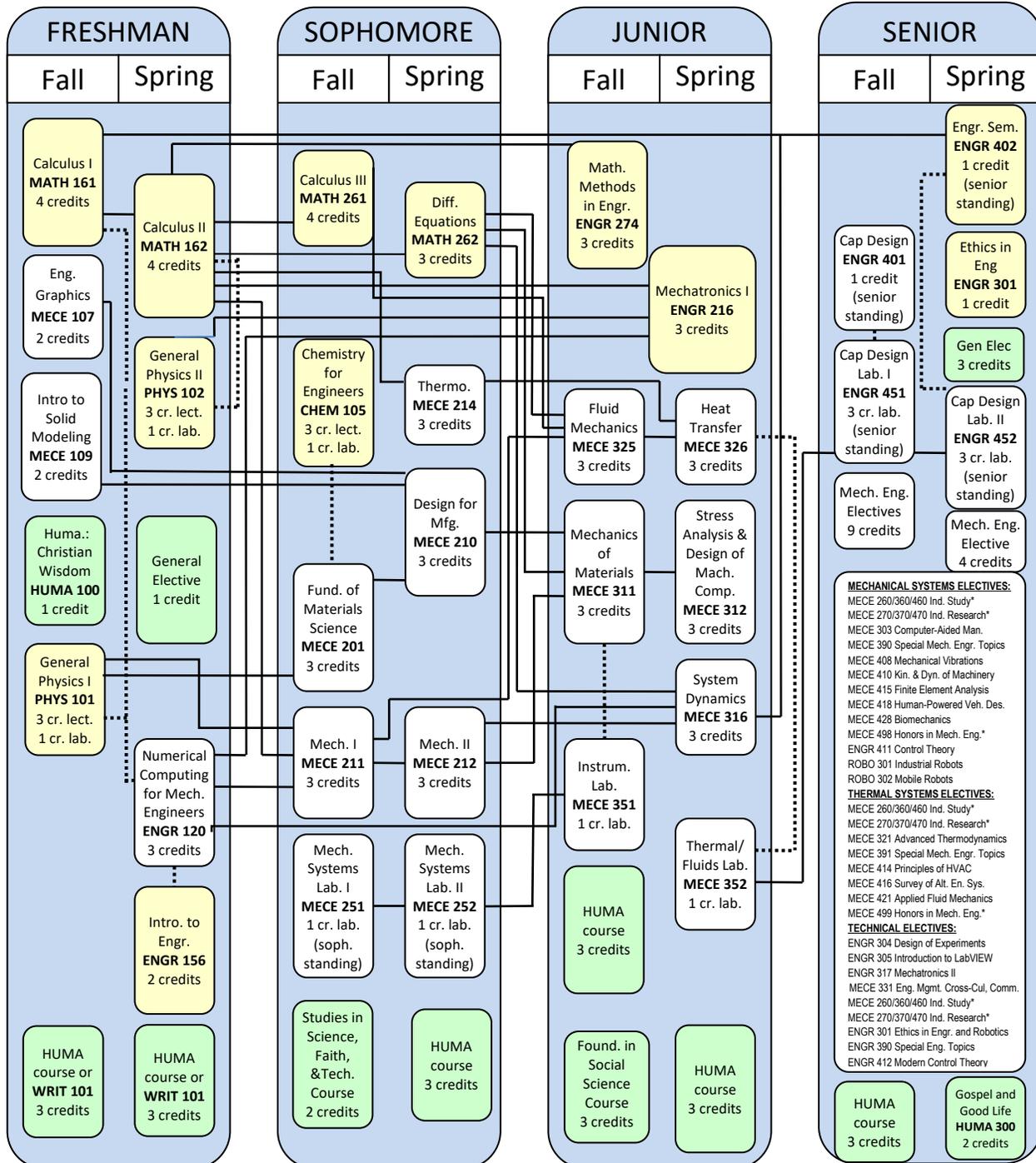
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Instagram: @gcc.engineering

Course Flow Chart with Prerequisites



MECHANICAL ENGINEERING Curriculum and Prerequisites for the B.S.M.E Degree



— Prerequisite on left
 Corequisite course
 TOTAL CREDIT HRS. REQU. = 128
 General Education Requirements (30 credits)
 Major Related Requirements (minimum of 37 credits)
 Mechanical Engineering Requirements (61 credits)

*Students must take a total of 13 credits, selecting a minimum of 3 credits from each system (Mechanical Systems or Thermal Systems). Six credit hours must be 400 level classes and a maximum of 4 credits from 1 and 2 credit courses. Prerequisites vary.

Requirements for the B.S.M.E. for students entering in the fall of **2025**

Grove City College Status Sheet

Status Sheets are provided as a convenience for the student and may be helpful for recording completed courses. However, the College Bulletin is the controlling authority on all requirements. Questions should be directed to your academic advisor or the Registrar.

(WI)=Writing Intensive, (SI)=Speaking Intensive, (IL)=Information Literacy courses.

B.S. in Mechanical Engineering Entering in 2025

(REVISED 03-03-2025)

Name: _____

ID# _____

Year of Anticipated Graduation: _____

Date: _____

Advisor: _____

TOTAL HOURS REQUIRED FOR THIS DEGREE ----- 128 HOURS

Minimum CQPA and MQPA required for graduation ----- 2.00

General Education + Elective Requirements -----30 HOURS

MQPA Courses ----- MECE; ROBO; ENGR (excluding 480)

Major Requirements ----- 98 HOURS

GENERAL EDUCATION REQUIREMENTS ----- 26 HOURS

MECHANICAL ENGINEERING REQUIREMENTS ----- 49 HOURS

	Cr.	Sem. Taken	Grade
HUMANITIES CORE ----- 18 HOURS			
HUMA 100 The Humanities: Christian Wisdom	1	_____	_____
HUMA 200 Western Civilization	3	_____	_____
HUMA 202 Civilization and Literature	3	_____	_____
HUMA 204 Civilization and the Arts	3	_____	_____
HUMA 261 Scripture & Theology for the Chr. Life I	3	_____	_____
HUMA 271 Scripture & Theology for the Chr. Life II	3	_____	_____
HUMA 300 Gospel & the Good Life: Christian Ethic	2	_____	_____

WRITING REQUIREMENT ----- 3 HOURS			
WRIT 101 Found. of Academic Discourse (W/IL)	3	_____	_____

FOUNDATIONS OF THE SOCIAL SCIENCES* ----- 3 HOURS			
Choose one course from the following:			
ECON 120 Foundations of Economics	PSYC 101 Foundations of Psychology	PSYC 200 Cross-Cultural Psychology	
HIST 120 Foundations of History	SOCW 101 Foundations of Social Work		
HIST 204 Historical & Phil. Found. of Education	SOCI 101 Foundations of Sociology		
POLS 101 Foundations of Political Science	SOCI 103 Found. of Cultural Anthr.		
	3	_____	_____

NATURAL SCIENCE (with lab)/ QUANTITATIVE/LOGICAL REASONING 0 HOURS			
(1) Natural Science with lab	4	(Met through major)	_____
(2) Quantitative/Logical Reasoning	3-4	(Met through major)	_____
(3) Third course in Natural Science, Quantitative or Logical Reasoning	3-4	(Met through major)	_____

STUDIES IN SCIENCE, FAITH, & TECHNOLOGY ----- 2 HOURS			
Choose one course from the following:			
COMP 205/SSFT 205 Ethics, Faith, and the Conscious Mind			
PHIL 243 Science and the Human: Inquiry, Design, & the Person			
SSFT 210 Science & Religion			
SSFT 212 Science, Faith, Technology, & Origins			
	2	_____	_____
	2	_____	_____

GENERAL ELECTIVES ----- 4 HOURS			
_____	_____	_____	_____
_____	_____	_____	_____

MAJOR-RELATED REQUIREMENTS ----- 36 HOURS			
CHEM 105 Chemistry for Engineers	4	_____	_____
OR			
CHEM 111 General Chemistry I	3	_____	_____
CHEM 113 General Chemistry I Lab	1	_____	_____
ENGR 156 Introduction to Engineering	2	_____	_____
ENGR 216 Mechatronics I	3	_____	_____
ENGR 274 Math Methods in Engineering	3	_____	_____
ENGR 301 Ethics in Engineering	1	_____	_____
MATH 161 Calculus I	4	_____	_____
MATH 162 Calculus II	4	_____	_____
MATH 261 Calculus III	4	_____	_____
MATH 262 Differential Equations	3	_____	_____
PHYS 101 General Physics I	4	_____	_____
PHYS 102 General Physics II	4	_____	_____

	Cr.	Sem. Taken	Grade
MECE 107 Engineering Graphics	2	_____	_____
MECE 109 Intro to Solid Modeling	2	_____	_____
ENGR 120 Numerical Computing for Engineers	3	_____	_____
MECE 201 Fundamentals of Material Science	3	_____	_____
MECE 210 Design for Manufacturing	3	_____	_____
MECE 211 Mechanics I	3	_____	_____
MECE 212 Mechanics II	3	_____	_____
MECE 214 Thermodynamics	3	_____	_____
MECE 251 Mechanical Systems Lab I (IL)	1	_____	_____
MECE 252 Mechanical Systems Lab II	1	_____	_____
MECE 311 Mechanics of Materials	3	_____	_____
MECE 312 Stress Analysis/Design of Mach. Comp.	3	_____	_____
MECE 316 System Dynamics	3	_____	_____
MECE 325 Fluid Mechanics	3	_____	_____
MECE 326 Heat Transfer	3	_____	_____
MECE 351 Instrumentation Lab (WI)	1	_____	_____
MECE 352 Thermal / Fluids Lab	1	_____	_____
ENGR 401 Engineering Design	1	_____	_____
ENGR 402 Engineering Senior Seminar	1	_____	_____
ENGR 451 Capstone Design Laboratory I (W/IS)	3	_____	_____
ENGR 452 Capstone Design Laboratory II (SI)	3	_____	_____

MECHANICAL ENGINEERING ELECTIVES ----- 13 HOURS
Select a minimum of 3 credit hours from each systems area. At least 6 credit hours must be 400-level courses with a maximum of 4 hours from one and two credit courses.

MECHANICAL SYSTEMS ELECTIVES:			
MECE 260/360/460** Independent Study	1-3	_____	_____
MECE 270/370/470** Independent Research	1-3	_____	_____
MECE 303 Computer-Aided Manufacturing	3	_____	_____
MECE 390 Special Mechanical Engineering Topics	1-4	_____	_____
MECE 408 Mechanical Vibrations	3	_____	_____
MECE 410 Kinematics & Dynamics of Mach.	3	_____	_____
MECE 415 Finite Element Analysis	3	_____	_____
MECE 418 Human-Powered Vehicle Design	3	_____	_____
MECE 428 Biomechanics	3	_____	_____
MECE 498 Honors in Mechanical Engineering	1-3	_____	_____
ENGR 411 Control Systems	3	_____	_____
ROBO 301 Industrial Robotics	3	_____	_____
ROBO 302 Mobile Robots	3	_____	_____

THERMAL SYSTEMS ELECTIVES:			
MECE 260/360/460** Independent Study	1-3	_____	_____
MECE 270/370/470** Independent Research	1-3	_____	_____
MECE 321 Advanced Thermodynamics	3	_____	_____
MECE 391 Special Mechanical Engineering Topics	1-4	_____	_____
MECE 414 Heating, Ventilating, and Air Conditioning	3	_____	_____
MECE 416 Survey of Renewable Energy Systems	3	_____	_____
MECE 419 Propulsion and Power	3	_____	_____
MECE 421 Applied Fluid Mechanics	3	_____	_____
MECE 499 Honors in Mechanical Engineering	1-3	_____	_____
TECHNICAL ELECTIVES:			
MECE 260/360/460** Independent Study	1-3	_____	_____
MECE 270/370/470** Independent Research	1-3	_____	_____
ENGR 209 Solidworks: Modeling & Simulation	2	_____	_____
ENGR 317 Mechatronics II	3	_____	_____
ENGR 304 Design of Experiments	1	_____	_____
ENGR 305 Introduction to LabVIEW	1	_____	_____
ENGR 331 Engr. Mgt. & Cross-Cultural Comm	3	_____	_____
ENGR 390 Special Engineering Topics	3	_____	_____
ENGR 412 Modern Control Theory	3	_____	_____
ENR 304 Intellectual Property Protection	1	_____	_____

** A combined total of up to three credit hours for independent study, independent research, faculty-mentored research, and honors courses can be applied towards the Engineering Electives requirement.

SAMPLE FOUR-YEAR PLAN for the BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Freshman Year

<u>Fall</u>	<u>Credits</u>	<u>Spring</u>	<u>Credits</u>
MATH 161 Calculus I.....	4	ENGR 156 Intro to Engineering.....	2
MECE 107 Engineering Graphics.....	2	MATH 162 Calculus II	4
MECE 109 Intro to Solid Modeling.....	2	ENGR 120 Numerical Computing for Engineers... ..	3
Writing Requirement or HUMA Course.....	3	PHYS 102 General Physics II.....	4
PHYS 101 General Physics I.....	4	Writing Requirement or HUMA Course.....	<u>3</u>
HUMA 100 The Humanities: Christian Wisdom.....	<u>1</u>	General Electives... ..	<u>1</u>
	16		17

Sophomore Year

<u>Fall</u>	<u>Credits</u>	<u>Spring</u>	<u>Credits</u>
CHEM 105 Chemistry for Engineers.....	4	MATH 262 Differential Equations	3
MATH 261 Calculus III.....	4	MECE 210 Design for Manufacturing.....	3
MECE 201 Fundamentals of Material Science.....	3	MECE 212 Mechanics II.	3
MECE 211 Mechanics I.....	3	MECE 214 Thermodynamics.	3
MECE 251 Mechanical Systems Lab I.....	1	MECE 252 Mechanical Systems Lab II.	1
SSFT course*.....	<u>2</u>	HUMA Course.....	<u>3</u>
	17		16

Junior Year

<u>Fall</u>	<u>Credits</u>	<u>Spring</u>	<u>Credits</u>
MECE 311 Mechanics of Materials.....	3	MECE 312 Stress Analysis/Design of Mach. Comp.	3
MECE 325 Fluid Mechanics.....	3	MECE 316 System Dynamics.....	3
MECE 351 Instrumentation Lab.....	1	MECE 326 Heat Transfer.....	3
Foundations of the Social Sciences.....	3	MECE 352 Thermal / Fluids Lab.....	1
ENGR 274 Math Methods in Engineering.....	3	ENGR 216 Mechatronics I.....	3
HUMA Course	<u>3</u>	HUMA Course.....	<u>3</u>
	16		16

Senior Year

<u>Fall</u>	<u>Credits</u>	<u>Spring</u>	<u>Credits</u>
ENGR 401 Engineering Design	1	ENGR 452 Capstone Design Project II.....	3
ENGR 451 Capstone Design Project I.....	3	Mechanical Engineering Electives*.....	4
Mechanical Engineering Electives*.....	9	ENGR 301 Ethics in Engineering and Robotics... ..	1
HUMA Course	<u>3</u>	ENGR 402 Engineering Senior Seminar	1
	16	HUMA 300 Gospel and the Good Life: Christian Ethics... ..	2
		General Elective*	<u>3</u>
			14

*Marked courses are not restricted to the time slots as shown in this suggested schedule.

NOTE: Scheduling time conflicts may occur for students who deviate from the above plan. Any exception to the classes listed on the other side of the page must have prior written approval of the department chairman.

TOTAL CREDIT HOURS REQUIRED = 128

Special GCC Mechanical Engineering (ME) Department Offerings

MINORS

Robotics

The field of robotics is rapidly growing and Grove City is excited to be devoting important resources to the development of this discipline. Students complete 19-20 hours of course requirements for the minor (no additional credits are required; students take specific classes to fulfill mechanical engineering requirements). Courses feature hands-on learning experiences, practical design, and programming courses.

STUDY ABROAD

Mechanical Engineering majors can partake in several study abroad opportunities ranging from short term faculty-led travel courses to various summer programs. New options are added each year.

Note: Previously offered semester abroad program for engineering is currently being re-evaluated.

UNDERGRADUATE RESEARCH OPPORTUNITIES

Opportunities exist for students to become involved in research during the school year and summer. Current research areas include alternative energies, biomimetic propulsion, experimental fluid dynamics, biomedical instrumentation, acoustical biometrics, organ-on-a-chip, non-destructive material testing, and more.

ENGINEERING CLUBS and TEAMS

There are many engineering-related clubs which interest ME students. American Society of Mechanical Engineers (ASME), Society of Automotive Engineers (SAE), American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE), Society of Women Engineers (SWE), and Engineers with a Mission (EWM) are active clubs on campus, each appealing to different aspects of engineering. In addition, there are three teams which give students more hands-on experience in designing, manufacturing, and competing at various competitions; they are the SAE Baja Team, ASME Human-Powered Vehicle Team, and the Robotic Team.



GCC ME Department Employment Information

Over the past 5 years, an average of **97% of our graduates found employment or attended graduate school within 6 months of graduation.** Starting salaries for 2024 graduates averaged \$69,753 with a maximum offer of \$96,000. The median salary was \$72K. Our placement rate at the time of graduation this year was 58%. This includes those graduates with full-time jobs or those with plans to attend graduate school full-time.

Year	% students employed 6 months after graduation*
2024	98%
2023	95%
2022	100%
2021	96%
2020	98%

*Includes a small percentage of students (typically about 10% or less) who chose to attend graduate school full time. Results based on a typical response rate close to 100%.

Class of 2025 – Employment at Graduation

Bechtel Plant Machinery, Inc. Belleville International Bloom Engineering Company Blue Fox Automation BMW USA, Inc. Braho Machinery Clymer Farner Barley, Inc. Davis Design and Contracting Designed Conveyor Ethos Civil Feldmeier Equipment, Inc. Imperial Systems, Inc. JLG Industries, Inc. Morgan Engineering NAS Patuxent River Oliver Healthcare Packaging	Premier Automation Rockland Manufacturing Rovisys rpGratta Siemens Energy Stantec T&M Associates Thompson Consulting Engineers The Timken Company Wabtec Corporation Wabtec Corporation Walt Disney Company Westinghouse Electric Company, LLC Westinghouse Electric Company, LLC Westinghouse Whiting-Turner Contracting Company
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Class of 2024

Allegheny Performance Plastics, LLC
Allen & Shariff Corporation
AVANGRID
Bechtel Plant Machinery, Inc.
Elliott Group
Ellwood National Forge
FHG, Inc.
FS Elliott Co., LLC
Havtech
Ingersoll Rand
JLG Industries, Inc.
Johns Hopkins University Applied
Physics Laboratory
Komatsu (2)
Liberty Electronics, Inc.
Linde
MEI Engineering, Inc.
Michael Baker International
Nasatka Security
Naval Surface Warfare Center
Premier Hydrics
Renick Brothers Mechanical Contracting
R-V Industries
Siemens
SSM Industries, Inc.
Stantec (2)
Textron
TURBOCAM International
Wabtec Corporation
Walter R. Dorn Est., Inc.
Westinghouse Electric Company (2)

Class of 2023

Agile Space Industries
Armstrong World Industries
Bayer Corporation
Bell Flight
Bell Helicopter
Camcraft
Chromalox
Clear Water Services
Constellation
Cummins Inc.
Daher Kodiak Aircraft Company
Data Science Automation
Integrated Industrial Technologies, Inc.
Johnson Controls
KEYENCE Corporation of America
Lake Superior Consulting
LLI Engineering
Naval Nuclear Laboratory
Northrop Grumman Corporation
RFA Engineering
Sight and Sound Theaters
Somerset Engineering
Tessy Automation, LLC
The Timken Company
Webster Industries, Inc.
Westinghouse Electric Company (3)

Class of 2022

Albanese Solutions, LLC
Bechtel Plant Machinery, Inc. (2)
Bell-Mark Technologies
Bloom Engineering Company, Inc.
CaptiveAire Systems
Chelsea Building Products
Daher Kodiak Aircraft Company
Dahlstrom Roll Form
E. & J. Gallo Winery
E-ONE
General Dynamics, Electric Boat (2)
GKN Driveline, Inc.
Harmony Castings, LLC
Havtech (2)
II-VI, Inc.
Imperial Systems, Inc.
Integrated Industrial Technologies, Inc.
Israel Defense Force
Kurt J. Lesker Company
Liberty Electronics, Inc.
McKim and Creed
Metalwerks
Naval Research Laboratory
Page, Southerland, Page, Inc.
RE2 Robotics
Renick Brothers Construction (2)
Savannah River Nuclear Solutions, LLC
SMS Group, Inc.
Swagelok Company
Testing Solutions, Inc.
United States Navy
VALCO
Volvo Group North America
Wabtec Corporation (3)
WB Engineers & Consultants
Westinghouse Electric Company (4)

Class of 2021

Allied Machine & Learning
Armstrong World Industries
Belcan, LLC
Channellock, Inc. (2)
Conveyor & Automation Technologies
Exelon Corporation
FedEx Ground
FM Global
Gateway Engineers
General Aluminum Manufacturing Company
I2T Automation and Mining
Integrated Environmental Systems
Katapult Engineering
Naval Research Laboratory (2)
Naval Surface Warfare Center Carederock Division
Omicell
Peraton
ProDrive Technologies
Regulus – Group
Sepro America
SMS Group
Stantech
Stephany Associates, Inc.
Thorson Baker & Associates
Tri-State Fabrication & Machining
Turner Industries Group, LLC

GCC ME Department Graduate School Information

Graduate Schools Attended Full-Time Immediately After Graduation

Classes of 2007-2025

(enrolled in M.S. or Ph.D. programs)

Boston University

Carnegie Mellon University

Colorado State University

Florida State University

Gannon University

Georgia Tech

Johns Hopkins University

Massachusetts Institute of Technology/Woods Hole Oceanographic Institution

Old Dominion University

Oregon State University

Pennsylvania State University

Princeton University

Purdue University

Texas A&M

Temple University

University of Alabama

University of Delaware

University of Florida

University of Kentucky

University of Maryland

University of Michigan

University of Pennsylvania

University of Pittsburgh

University of Rochester

University of Virginia

University of Wisconsin – Madison

Vancouver Film School

Virginia Tech

GCC ME Department Internship Information

Over the past 5 years an average of **66% of our graduates participated in summer engineering internship work experiences.**

Graduation Year	% Students Participating in Internships*
2025	78%
2024	54%
2023	66%
2022	74%
2021	58%
Average	66%

*Most students participate in engineering internships during the summer between their junior and senior years. Some students find internships after their freshman and/or sophomore years. Internships are work experiences designated by their employer as experiences with significant engineering content, but lacking a formal designation.

A listing of employers that hired our students for these summer internships is shown below and on the following two pages.

<p><i>Class of '25 Summer Internships</i> Abtex Allen & Shariff Ardagh Metal Packaging Belleville International Braho Machinery CJL Engineering Eagle Machinery and Supply East Manufacturing Company EZFLOW USA, Inc. Glenair Integrated Industrial Technologies JLG Industries Lisk Meadville Forging Company Morgan Engineering Company</p>	NAS Patuxent River Orbital Engineering Rockland Manufacturing Siemens Stantec T&D Pool Construction T&M Associates Thompson Consulting Engineers TIMET Trucut, Inc. Wabtec Westinghouse (3) Whiting Turner Contracting Company WNA Engineering (2) Xylem, Inc.
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<p>Class of '24 Summer Internships</p> <p>Apex Manufacturing Bell Flight Building Integrated Services Daher Kodiak (2) Four Growers, Inc. Harmony Castings HF Sinclair Human Engineering Research Labs (HERL) II-VI Incorporated ITW Food Equipment Group Keyence Kice Industries Komatsu Mining Machinery McDonald's Men-O-Lan</p>	<p>Pennoni Professional Engineer Balance Lab, LLC Quality Bicycle Products Renick Brothers Mechanical Contractor RW Supply and Design Siemens (2) Sight and Sound Theaters Somerset Engineering TE Connectivity VersaFab, Inc. Wabtec Webster Industries, Inc. Westinghouse Electric Company (2) Yates Precision Manufacturing (2) York Alliance Church</p>
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<p>Class of '23 Summer Internships</p> <p>Armstrong World Industries BellFlight Butler Technologies Camcraft, Inc. Dairy Farmers of America Franklin Bronze Precision Components HF Sinclair Highland Tank II-VI Incorporated Keyence Kice Industries Kodiak Aircraft Company Metalkraft, Inc. (2) MSA The Safety Company Omnicell (2) Penn DOT</p>	<p>Pennoni Professional Engineer Balance Lab, LLC Quality Bicycle Products Renick Brothers Mechanical Contractor RW Supply and Design Siemens (2) Sight and Sound Theaters Somerset Engineering TE Connectivity VersaFab, Inc. Wabtec Webster Industries, Inc. Westinghouse Electric Company (2) Yates Precision Manufacturing (2) York Alliance Church</p>
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<p><i>Class of '22 Summer Internships</i></p> <p>Albanese Solutions LLC Andritz Aurora Innovations Ben Gurion University of the Negev Burpee Med Systems Burwick Offrey Buist, Inc. CaptiveAire Systems CJH Industrial Dahlstrom Roll Form Design Group Americas Design Tech, Inc. Duquesne Light Company Exelon FMRW Engineering (2) Front Street Shipyard GJN Automotive Grove City College Harmony Castings, LLC Hiltran Corp. Human Engineering Research Laboratory Imperial Systems Inventionland IoMosaic</p>	<p>Kodiak Aircraft Kurt Lester Lockheed Martin Mack Molding (2) Matthews International (2) McKim and Creed Metec National Energy Technology Laboratory Onex Penn United Technologies Product Evaluation Systems, Inc. Pulva Corp. Re2 Robotics Refresco (2) Seakeeper Siemens Sierra Mountain Construction Swagelok Testing Solutions, Inc. VEKA, Inc. Volvo Group Wabtec (2) Waynesboro Design Services</p>
<p><i>Class of '21 Summer Internships</i></p> <p>A & P Hydraulics Air Force Beckett Gas Bob Barker Company Burpee Med Systems Cadence Inc (2) Channellock, Inc. ChemCut Corp. Church of the Saviour CJL Engineering (2) Cadence Inc (2) Control Design, Inc. Crayola Custom Valve Repair Earth Engineering, Inc. Exelon Nuclear Flex-Cell Flinchbaugh Engineering FM Global General Aluminum Manufacturing Company</p>	<p>The Hershey Company Honda R&D Americas Johnson Controls Katapult Engineering Naval Research Lab Omnicell Peters Heat Treating PIAD Precision Casting Poole and Kent Preferred Utilities Manufacturing Corp. Robinson Fans Shapiro & Duncan Siemens SMS Inc. Southco, Inc. Stantec Technibus, Inc. Titan Medical Group</p>

GCC ME Department FE Data (Fundamentals of Engineering Exam – the first step towards licensing as a Registered Professional Engineer)

Over the past 5 years an average **of 91.2% of those students who took the FE exam passed the exam**. We strongly urge all graduating students to take this exam.

Year	GCC ME Student Pass Rate	National Pass Rate
2024	85%	73%
2023	100%	70%
2022	94%	70%
2021	85%	73%
2020	92%	78%
Average	91.2%	72.8%

Mechanical Engineering Faculty and Staff

Tim Homan

Interim Dean of Hopeman School of Science, Engineering, and Mathematics
Professor of Chemistry

Post-doctoral Associate, University of Minnesota, Organic Electrochemistry
Ph.D., University of Colorado, Organic Chemistry
B.S., Gardner-Webb University, Chemistry
Specialty: Synthetic Chemistry

Dr. Homan has been on the faculty of Grove City College since 1991. During his tenure, he served as department chair for 14 years which included establishing American Chemical Society certification for the chemistry program, and the design and construction of a new science building.

Stephanie Adams

Staff Assistant, Hopeman School of Science and Engineering
Prehealth and ABET Coordinator
B.S., Grove City College

Stephanie came to Grove City College in February 2010. She is the staff assistant for the Hopeman School of Science, Engineering, and Mathematics. Before joining GCC, she worked at Franklin Insurance Agency as Operations Manager and at On Bank as a mortgage servicing supervisor.

Erik Anderson

Professor of Mechanical Engineering
Ph.D., Massachusetts Institute of Technology/Woods Hole
Oceanographic Institution
M.Sc., St. Francis Xavier University
B.S., Gordon College

Thermal Systems Faculty

Specialized Areas – Fluid Mechanics, Biomechanics, Robotics, Intersection of Science and Christianity
Key Courses Taught – Applied Fluid Mechanics; Mathematical Methods in Engineering; Biomechanics; Industrial Robotics, Studies in Science, Faith, and Technology

Additional Items of Note – William J. Fulbright Scholar in the area of experimental biofluid dynamics; postdoctoral fellow in Ichthyology at Harvard University; guest investigator at Woods Hole Oceanographic Institution

Erik Bardy

Professor and Chair of Mechanical Engineering
Senior Faculty Fellow – Stan and Karen Office of Global Programs
Ph.D., M.S.M.E., B.S.M.E., SUNY at Buffalo

Thermal Systems Faculty

Specialized Areas – HVAC and Thermodynamics

Key Courses Taught – Thermodynamics, HVAC, Instrumentation Laboratory, Survey of Renewable Energy Systems

Dr. Bardy is a dual French-American national. He is very involved in the International Studies Programs here at Grove City College, directing many short term travel courses as well as developing new opportunities for our students to gain international experience. Dr. Bardy is the faculty advisor for ASHRAE, Engineers with a Mission, Men of God, and the GCC Swing Club.

Charles Clauss

Additive Manufacturing and Laboratory Support Engineer
B.S. in Mechanical Engineering, Grove City College

Key Courses Supported – Mechanical Systems Lab I & II, Design for Manufacturing, Archery, and other course projects

Charles rejoined the College in 2022 and instructs the sophomore labs, works in the machine shop as well as the materials testing area. He arranges and supervises plant tours to a variety of manufacturing facilities, exposing the students to many different aspects of this important component of engineering. He also manages the department's Additive Manufacturing Suite.

David Beevers

Associate Professor of Mechanical Engineering
Ph.D., Penn State University
M.S.M.E., Penn State University
B.S.M.E., Grove City College

Thermal Systems Faculty

Specialized Areas – Machine Design and Manufacturing

Key Courses Taught – Stress Analysis/Design of Machine Components, Instrumentation Laboratory, Thermo/Fluids Laboratory, Kinematics/Dynamics of Machinery

Dr. Beevers joined us in 2025 after 10 years of teaching at Penn State Behrend, where he taught a variety of engineering mechanics and thermal-fluids courses. As a former Grove City student himself, he has a strong desire to see future generations of engineers receive the same exceptional education that he received. He also supervises some of our capstone design teams, a task to which he also brings many years of experience. He is always excited to see what the seniors accomplish each year.

Michelle A. Clauss

Professor and Assistant Chair of Mechanical Engineering
Ph.D., Carnegie Mellon University
B.S., Grove City College

Thermal Systems Faculty

Specialized Areas – Fluid Mechanics, Mechanics, Biomedical Engineering

Key Courses Taught – Mechanics I & II, Fluid Mechanics, Bio Fluid Mechanics, Intro to Engineering

Dr. Clauss was a recipient of the NSPE Roger Clark Dawes Award and has been recognized as an “Outstanding Young Woman of America.” She currently serves as advisor to the Society of Women of Engineers Student Chapter as well as the Applied Science and Engineering majors. Dr. Clauss is very involved in outreach and helping the next generation to become excited about STEM, especially engineering.

John Dixon

Professor of Mechanical Engineering
Ph.D., University of Minnesota
M.S.M.E., University of Minnesota
B.S.M.E., Grove City College

Thermal Systems Faculty

Specialized Areas – Heat Transfer, Thermodynamics, Engines/Emissions

Key Courses Taught – Survey of Renewal Energy Systems, Measurement Lab, Engineering Graphics, Numerical Computing for Engineers, Internal Combustion Engines, Finite Element Analysis

Dr. Dixon’s industrial experience includes work as an engineer for Cummins Power Generation, developing fuel systems and improving emissions for new products. He is also the advisor for the SAE Baja Team.

Mark Fair

Professor of Mechanical Engineering and Physics
Ph.D., Carnegie Mellon University
B.S., Grove City College

Thermal Systems Faculty

Specialized Areas – Transport Phenomena, Mechanics, Thermodynamics, Scientific Computing

Key Courses Taught – Fundamentals of Materials Science, Heat Transfer, Mechanics, Thermal/Fluids Laboratory

Dr. Fair joined the faculty at GCC in 2004 after working in industry at Aristech Chemical Corporation and Aristech Acrylics, LLC. His industrial experience includes research and development for acrylic polymerization and related processes; design and process engineering for the design, construction, and startup of a continuous casting machine to produce acrylic sheet and of a reactor system to produce acrylic syrup; process engineering for various systems including an automated chemical addition system; and control systems engineering. He also performed research in polymer physics as postdoctoral fellow at Stanford University. Dr. Fair has taught a variety of physics courses in addition to mechanical engineering courses.

Luke Johnson

Mechanical Engineering Technician and Machine Shop Supervisor
B.S.M.E., Grove City College

Key Courses Supported – Mechanical Systems Lab I & II, Design for Manufacturing, Computer-Aided Manufacturing, Capstone Design Lab

Luke joined the college in 2022 after working as a design engineer for Channellock, Inc., in Meadville PA. He is experienced in many machine shop practices, including traditional machining, CNC programming, welding, and electrical discharge machining (EDM). Through working in the forging, stamping, casting, and tool & die making industries, he has acquired a broad base of knowledge in the realms of tooling design and design for manufacturing (DFM) practices. Luke also helps advise the SAE Baja Team.

Rachel Kohler

Assistant Professor of Mechanical Engineering
Ph.D., Purdue University
M.S., Purdue University
B.S., Liberty University

Mechanical Systems Faculty

Specialized Areas – Biomedical Engineering, Organ-on-a-Chip, Computed Tomography

Key Courses Taught – Intro to Engineering, Fundamentals of Biomedical Engineering, Numerical Computing for Engineers, Design of Experiments

Dr. Kohler joined the department in 2024, focusing on Biomedical Engineering topics. She helps to teach several courses for the Applied Science and Engineering majors, as well as advise students in the major. Dr. Kohler advises Capstone Projects that have biomedical aspects.

Qiuyan Li

Associate Professor of Mechanical Engineering
Ph.D., University of Pittsburgh
M.S., University of Pittsburgh

Mechanical Systems Faculty

Specialized Areas – Additive Manufacturing, Non-destructive Ultrasonic Testing, Electro-Mechanical Systems

Key Courses Taught – Mechanics of Materials, Introduction to Solid Modeling, System Dynamics, Design for Manufacturing

Dr. Li joined the faculty in 2021. Her research interests include the theoretical and experimental analysis of surface acoustic wave excitation and propagation in solids by an ultrasonic transducer system, and fabrication and characterization of piezoresistive thin film sensors. She serves as the faculty advisor to ASME GCC student chapter and Human-Powered Vehicles club.

George (“Geo”) A. Richards

Associate Professor of Mechanical Engineering

Ph.D., Purdue University

M.S.M.E., B.S.M.E., Clarkson University

Thermal Systems Faculty

Specialized Areas – Energy Conversion, Propulsion, and Power

Key Courses Taught – Advanced Thermodynamics, Sophomore lab, Propulsion and Power, Intro to Engineering

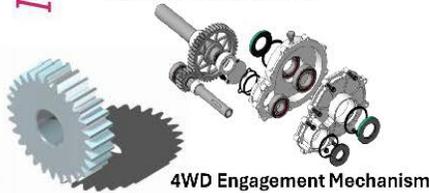
Dr. Richards joined the GCC faculty in 2019 after a research career with the National Energy Technology Laboratory. He has lead dozens of research projects on clean energy technology for the U.S. Department of Energy, as well as conducting inter-agency research (NASA, Dept. of Defense, Energy) related to advanced propulsion and power. Dr. Richards has authored or co-authored seven book chapters, multiple articles, and seven patents, all related to energy technology. He currently serves as an associate editor for the Journal of Propulsion and Power, American Institute of Astronautics and Aeronautics (AIAA). At GCC, Dr. Richards is leading student research projects to develop biomechanical diagnostics from video and audio recordings.

Past Two Year's Senior Design Projects

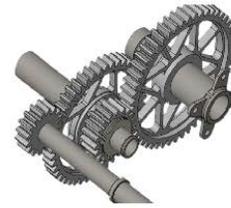
Mechanical Engineering

BAJA Capstone Project (2025)

The Baja Capstone Team was responsible for the design and manufacturing of a new SAE Baja Car for the Grove City College SAE Baja Club. This car will be maintained and raced for the next four years by the club in regional and national competitions. The main goals of this project were to simplify the design of the whole car, reduce overall weight, and increase drivetrain efficiency. To achieve these goals, the **frame was redesigned**, the **engine placement was changed** to better accommodate the transmission, **all gear ratios were mathematically modeled and optimized**, the **drivetrain was overhauled** by replacing the drive shaft and differentials with a direct drive belt, a **custom 4-wheel drive engagement mechanism** was implemented, **suspension geometry was analyzed and updated**, and a **new steering system** was designed. This car will be raced for the first time in June of 2025.



4WD Engagement Mechanism



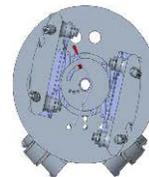
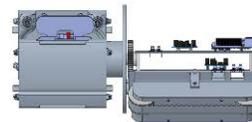
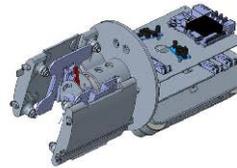
Rear Gearbox Gear Shafts

Mechanical Engineering

BPMI – Pipe Cleaning Robot (2025)

Project Requirements

- Debris Collection
 - Detect and collect any debris in the piping network
 - Non-magnetic metal chips <0.050", cloth fibers, dust
 - Special attention given to the crevice feature
 - Stretch goal of removing small pieces of tape and residue on the wall of the pipe
 - Stretch goal of collecting debris beyond the crevice feature
- Verification of cleanliness
 - Visual inspection
 - Wiping the interior surface of the pipe
- Robot Mobility
 - Robot must be capable of navigating piping feature without the need for physical manipulation
 - In the event of power loss, the robot must be able to be removed by a tether



Underwater Time of Flight ROV Mounted RGB Camera (2025)

Background

The Underwater Time of Flight (ToF) team worked in partnership with BeamSea Associates to develop a first-of-its-kind 3D Multicolored Time of Flight Camera.

Most ToF cameras only work in one color, but ours works with red, green, and blue by adapting an existing ToF camera to work in all three colors. We designed ours for underwater use, packaging it for deployment on a remotely operated vehicle (ROV).

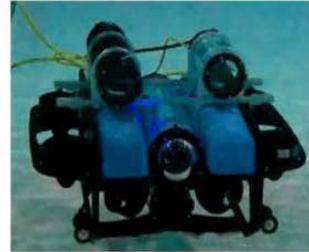
Goal

Create a waterproof enclosure system that can be mounted onto a submersible ROV.

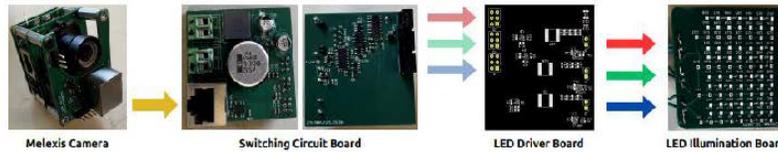
*Two tubes - one for our camera and the other for our LED system

*Custom made ring mounts, camera housing, and board inserts to help keep everything stable while ROV is in motion

*Tethered system with one power and one communications cable to above water control station



Camera/LEDs Mounted on the ROV



Melexis Camera

Switching Circuit Board

LED Driver Board

LED Illumination Board

Industrial Compressor Simulator (2025)

Goal: Develop a digital simulator that tests the FS Elliott's R1000/R2000 compressor control system

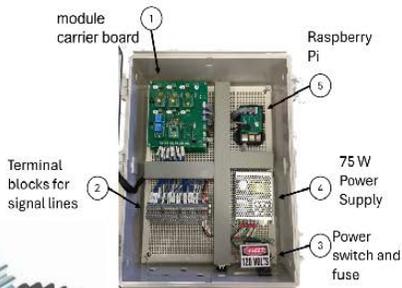
*Validate controller response to events, including load sharing and fault response

*Small form factor, configurable, expandable



R1000 Compressor Controller

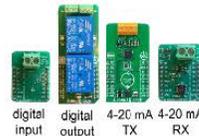
Enclosure and Panel Layout



User Interface



Supports up to 18 interchangeable signal modules



GoVinci: Nuclear Heat Exchange

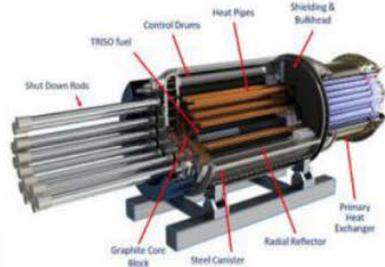
Project Goal (2025)

Design and manufacture a heat exchange sleeve for heat extraction from a heat pipe. The project is to be applied to Westinghouse's eVinci Microreactor - a 5 Mwe product currently in development.



Heat transfer sleeve applies to the primary heat exchanger

Make this as big as possible



Satellite Thrusters and Additive Research (2025)

The Objective



The goal of this project is to investigate how surface conditions resulting from additive manufacturing influence the nozzle coefficient and thrust direction in reaction control thrusters. The nozzles being studied generate less than 5N of force (1.12lbf) and will be tested using air as the cold gas.

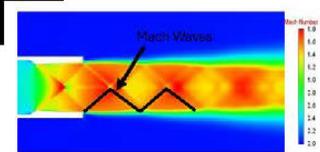
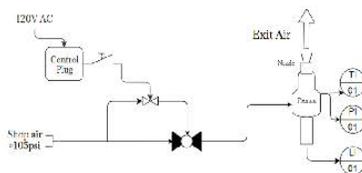


Image of Mach Waves from "A Numerical Approach and Study of the Shock-Wave Structure of Supersonic Jet Flow in a Nozzle"



Blue Origin BE-4 Rocket Engine with Over-Expanded Flow Showing Normal Shock



Our Schematic

- P stored in our experimental setup.
- S top air supplied at around 10psia
- 75psia in the plenum.
- P.enum. module is constrained in the 2 axial directions while the 3rd is left unconstrained.



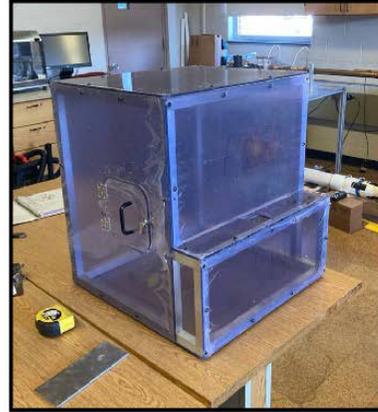
Vita In Vivo – ‘Life in Glass’ (2025)

Background:

- Supporting gut microbiome organ-on-a-chip research in the GCC biology department
- Microscopic imaging in an incubated environment is required to continue research in a current project
- Microfluidic tubing system is incompatible with existing incubator

Requirements:

- Average temperature: 37°C (40°C/20°C)
- CO₂ concentration: 5% (±1%)
- Humidity maintained
- Access to the chip being studied
- Microfluidic tubing access point
- Made of easily sterilized material
- Fits onto a 48"x30" tabletop
- Microscope controls accessible
- Control system capable of storing periodic temperature and CO₂ data



Industrial Automation – APP (2025)

Scope: The product will serve two key purposes:

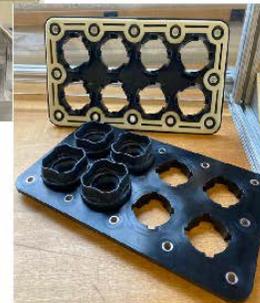
1. Assemble a power cable interface board
2. Assist an operator in performing a two-minute pressure test



- The assembly and testing process will be completed in five minutes or less per interface board.

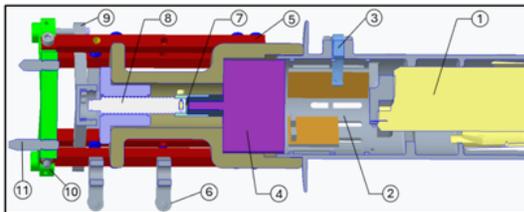
Process

1. Plate and gasket loaded to the lazy susan
2. Pressure test
3. Plate loading and mount
4. Bushing tray loaded to conveyor
5. Gripper assembly
6. Assembling the bushings
7. Final assembly



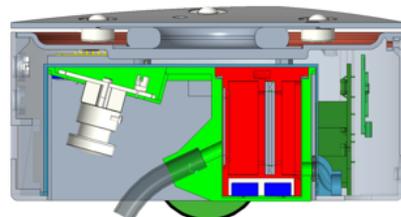
APP - Overmolding Insert Device (2024)

- The goal of the project was to design a device which would simultaneously seat 4 inserts into Allegheny Performance Plastics (APP) satellite cover mold prior to injection molding. The tool needed to be accurate and able to repeat its action without flaw. It also had to withstand high temperatures up to 350 F while still not damaging the mold.
- At the conclusion of the project, students were able to:
 - Deliver an ergonomical, handheld device that weighed approximately 3 pounds.
 - The average insertion cycle time was 10.8 seconds.
 - The device will dramatically improve the efficiency of the molding process, positively impacting both line technician and the company.
- This project was supported by Allegheny Performance Plastics (APP).



BPMI – Cleaning Robot (2024)

- This team was tasked to create a tethered, operator-controlled robot which would inspect for and retrieve debris in the operating environment. Debris included chips as small as 0.005 inches in diameter, and tape remnants and their adhesive residue. In addition, the robot had to withstand environmental ambient temperatures of 120 F and surface temperatures of 200 F.
- At the conclusion of the project students were able to:
 - Create a robot that would easily enter the limited-size port and maneuver the annular space with ease.
 - Create a robot that could display visual verification of debris and its successful removal by vacuum and/or scraping, .
 - Lighting was also provided in this small hand-held device.
- This project was supported by Bechtel Plant Machinery Inc. (BPMI).



Grove City Engineering of Microreactors: Heat Pipe Analysis (2024)

- The goal of the project was to build and test the dynamic performance of a heat pipe and simulate the physics associated with these devices.
- At the conclusion of the project students developed a lab-scale testing chamber :
 - Where no significant dynamic heat transfer complications were found.
 - Where dynamic transition beyond normal limits easily were reserved.
 - Where axial temperature profiles may be a useful diagnostic tool to be used in future work.
 - Where repeatable evidence for steady state and transient physical models of heat pipes was generated.
- This project was supported by Westinghouse.



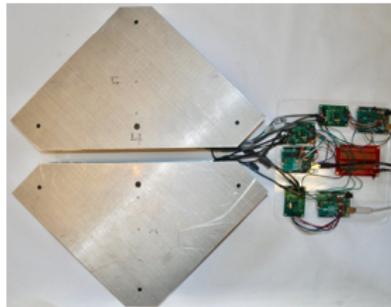
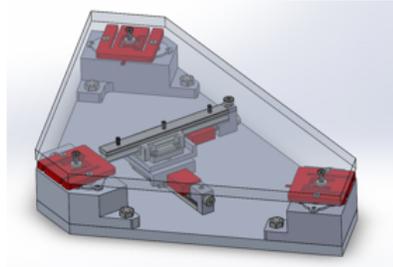
GCC Steam Team (2024)

- The goal of the project was to examine and compare the current steam-heating system at Grove City College to a network of decentralized boilers. Cost analysis for feasibility will also be conducted.
- At the conclusion of the project students:
 - Analyzed the current heating system by obtaining measurements for all buildings and then modeling them in TRACE 3D Plus.
 - Various boiler options were considered and annual costs determined.
 - Although a cost savings was found based on energy consumption, the savings were too small to cover the investment in the capital equipment and its depreciation.



Highmark Health - LegGo (2024)

- The goal was to design and create two low cost force plates that could be used to evaluate biomechanical asymmetry in college athletes. Applications in biomedical research, physical therapy, and athletic training are also a potential result.
 - The project was success in:
 - Building a set of plates that measured forces in all directions using 3 vertical and 2 horizontal sensors.
 - A significant reduction in cost was seen comparing the set of 2 plates to other commercial systems measuring the same data.
- This project was supported by Highmark Health.



V-Markings Road Line Geo Localizer (2024)

- The goal of this project was to build a working prototype that would detect highway lines within 0.5 meter accuracy by using an actuating arm for the camera along with a GNSS location system. The device could be employed by line marking trucks to immediately update databases of lane changes which will then be used by autonomous vehicles and HD maps.
- Student were able to:
 - Detect lines from a camera stream.
 - Build an arm to hold the camera over the line.
 - Record GNSS and truck heading data.
 - Create a user-interface.
 - Package the system for field deployment and successfully tested the system.
- This project was supported by V-Markings.

