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KETTERING UNIVERSITY CATALOG

About Kettering University

Kettering University, a pioneering STEM-focused institution, leads in rapidly evolving fields like advanced mobility, new energy vehicles, intelligent manufacturing, artificial intelligence, and sustainability. Kettering's vision—built on learning and, more importantly, mastery—places equal emphasis on acquiring and applying knowledge.

Since 1919, Kettering University has led the way in education, combining academics with practical learning. Through our unique 50/50 academic and Co-op approach, you will gain invaluable real-world experience alongside classroom instruction, propelling you ahead in your career from day one. Armed with the skills to solve the problems facing a changing world, you'll thrive in this dynamic learning environment that integrates theory and practice throughout your collegiate career.

Formerly known as General Motors Institute, Kettering has remained true to its educational heritage. Today, Kettering's Co-op model produces some of the most successful leaders and entrepreneurs in multiple leading industries.

Throughout your education at Kettering University, you'll alternate between classroom learning and professional work experiences with one of over 550 employment partners across the country and worldwide. This unique Co-op model allows engineering, computer science, and business students to gain advanced professional experience, positioning them for roles beyond entry-level upon graduation. Graduates become leaders among C-Suite executives, innovative entrepreneurs, and cutting-edge scientists and engineers. For more information about Kettering's distinctive Co-op education model and the latest updates from campus, visit kettering.edu/Co-op.

Recent rankings and designations include:

- Top 10 U.S. Colleges for Career Preparation (Wall Street Journal)
- #1 Starting Salaries in MI (SmartAsset)
- Top 25 Private Colleges in the Nation for Return on Investment (Georgetown University Center on Education and the Workforce)

Kettering faculty have received more Major Research Instrumentation grants from the National Science Foundation than any university in Michigan since 2012. They are among the leaders in the United States who have been awarded these grants, which have dramatically enhanced the institution's applied research capabilities.

Kettering University is a national leader in experiential STEM (science, technology, engineering, and math) and Business education. Through this proven approach, you'll realize your potential and advance your ideas by combining theory and practice better than any institution. Kettering University's mission is to achieve the extraordinary through technological innovation, leadership, and service. Learn more about our Mission and Vision at kettering.edu/about.

Accreditation

Kettering University is accredited by The Higher Learning Commission. In 2024, the HLC reaffirmed Kettering's ten-year institutional accreditation, meeting all five criteria and all 21 core accreditation components with no concerns or interim reporting requirements. As a result, HLC's Institutional Action Committee offered the University the option of adopting the Open Pathway, reserved for only the highest-performing institutions, allowing Kettering to pursue improvement projects in our design. It is important to note that this is the first time since our initial accreditation in 1962 that we have achieved a perfect accreditation scorecard. This reflects the extensive scope of our efforts over time, our commitment to addressing challenges, and our dedication to aligning solutions with our mission. Additionally, we are committed to upholding the Four Pillars that define True Kettering: Optimized Growth in Enrollment and Programs, Global Leadership in STEM Education, Community Vitality, and Engaged Stakeholders.

ABET accredits Kettering's degree programs in Chemical, Computer, Electrical, Industrial and Mechanical Engineering, and Computer Science. The Accreditation Council for Business Schools and Programs (ACBSP) accredits degree programs in the School of Management. These programs have been reaccredited over the past several years, and all also meet their respective reaccreditation criteria with no outstanding concerns.

Kettering University's institutional and specialty accreditations have been met with no concerns.

For more information on the University's accreditation, visit kettering.edu/accreditation.

Campus

Kettering University's campus in Flint, MI, occupies nearly 100 acres in the University Corridor district of the City. Kettering is a hub of STEM-focused education, featuring a combination of historic and modern facilities equipped with first-of-its-kind laboratories and industry-leading technology. The campus includes the Historic Academic Building, Campus Center, the Connie & Jim John Recreation Center, C. S. Mott Engineering and Science Center, Frances Willson Thompson Residence Hall, and the Innovation Center. The Learning Commons, a 105,000-square-foot, state-of-the-art facility for collaborative interactions and flexible learning spaces, opened in Summer 2022. Facilities include the nation's only autonomous vehicle proving ground on a college campus (the GM Mobility Research Center), a crash safety center, and high-tech lab and research equipment you can access from the moment you arrive on campus. Kettering facilities are handicapped-accessible and internally secured for key-card-only access. Convenient parking is provided adjacent to all campus buildings. Learn more about the University's location and facilities at kettering.edu/campus.

Learning Outcomes

University Learning Outcomes

In keeping with its mission, core values, and goals, Kettering University strives to ensure that graduates of its baccalaureate degree programs achieve the following learning outcomes:

1. KNOWLEDGE - Graduating Kettering University students will possess the knowledge of their discipline and be able to work effectively within the larger STEAM context.

- Students will demonstrate competence in their own fields of study.
- Students will be able to apply their knowledge/skills across a variety of contexts.

2. REASONING - Graduating Kettering University students will possess the ability to apply critical thinking and reasoning in a variety of contexts.

- Students will demonstrate critical thinking and reasoning.
- Students will be able to apply problem solving techniques successfully while taking into consideration the potential impact of those solutions.

3. COMMUNICATION - Graduating Kettering University students will communicate effectively in a variety of contexts.

- Students will communicate effectively using a variety of genres and formats.
- Students will communicate effectively to various audiences.

4. TEAMWORK - Graduating Kettering University students will function effectively within teams.

- Students will serve effectively as members and/or leaders of teams.
- Students will foster collaboration within teams.

5. ETHICS - Graduating Kettering University students will demonstrate ethical and socially-conscious behavior.

- Students will demonstrate professionalism.
- Students will demonstrate honesty, fairness, and equality.
- Students will demonstrate socially-conscious decision-making.

Non-Discrimination

Non-Discrimination Policy Statement

Kettering University, as an equal opportunity/affirmative action employer, complies with all applicable federal and state laws regarding nondiscrimination and affirmative action.

Kettering University is deeply committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, national origin, age, marital status, sex, sexual orientation including gender identity or expression, disability, religion, height, weight, genetic information, or veteran status in employment, educational programs and activities, and admissions except where religion, sex, or age are bona fide job related employment requirements.

Discrimination on the basis of race/ethnicity, color, ancestry, religion, national origin, sex, including marital status, age, disability, or status as a Vietnam-era veteran, special disabled veteran, recently separated veteran or other protected veteran is prohibited by federal and state statutes as amended, including Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973, the Pregnancy Discrimination Act of 1978, the Age Discrimination in Employment Act of 1978, the Vietnam Era Veteran's Readjustment Assistance Act of 1974, the Americans with Disabilities Act of 1990, and the Civil Rights Act of 1991.

Inquiries or grievances may be addressed to the Director of Human Resources, Office of Human Resources, 1700 University Avenue, Flint, MI 48504, 810-762-9500.

Title IX Statement

It is the policy of Kettering University to comply with Title IX of the Education Amendments of 1972, which prohibits discrimination (including sexual harassment and sexual violence) based on sex in the University's educational programs and activities. Title IX also prohibits retaliation for asserting or otherwise participating in claims of sex discrimination. The Title IX coordinator and the deputy coordinator have been designated to oversee Kettering's compliance with Title IX and to respond to reports of violations. For more information about Title IX, go to Kettering's Title IX website. A person may also file a complaint with the Department of Education's Office for Civil Rights regarding an alleged violation of Title IX by visiting the U.S. Department of Education's website or calling 800-421-3481.

2025-2026 ACADEMIC CALENDAR

This calendar also exists as a downloadable .pdf file on Kettering University's Academic Calendars Webpage. **Graduate Online does not use this calendar.**

Summer 2025

Date	Event
July 10	A-section Convocation, first year and transfer students move-in
July 10-13	New Student Orientation
July 12-13	Returning students move-in
July 14	Classes Begin
July 18 (Noon)	Last Day to add or drop courses for the term
August 10	Last Day for Course Withdrawal for Partial Refund
August 25 (Noon)	Undergraduate Student Midterm Grades Due
August 29-September 1	Labor Day Break (no classes)
September 7	Last Day for Undergraduate Course Withdrawal - No Refund
September 21	Last Day for Graduate Course Withdrawal - No Refund
September 23	Last Day of Classes (follow Friday schedule)
September 24	Reading Day (no classes)
September 25-27	Final Exam Period
September 27	Term Ends
September 29-October 3	Grading, Assessment & Professional Development for Faculty
October 3 (Noon)	Final Grades Due From Instructors. Final grade processing for the term will be completed by the next BUSINESS day.

Fall 2025

Date	Event
October 2	B-section Convocation, first year and transfer students move-in
October 2-5	New Student Orientation
October 4-5	Returning students move-in
October 6	Classes Begin
October 10 (Noon)	Last Day to Add or Drop Courses
November 2	Last Day for Course Withdrawal for Partial Refund
November 17 (Noon)	Undergraduate Student Midterm Grades Due
November 27-28	No classes
November 30	Last Day for Undergraduate Course Withdrawal - No Refund
December 14	Last Day for Graduate Course Withdrawal - No Refund
December 15-16	Last Day of Classes (follow Thursday/Friday schedule)
December 17	Reading Day (no classes)
December 18-20	Final Exam Period
December 20	Term Ends
December 22-26	Grading, Assessment & Professional Development for Faculty
December 29 (Noon)	Final Grades Due From Instructors. Final grade processing for the term will be completed by the next BUSINESS day.

Winter 2026

Date	Event
January 9	New Student Orientation (Virtual)
January 10-11	All students move-in
January 12	Classes Begin
January 16 (Noon)	Last Day to Add or Drop Courses
January 19	Dr. Martin Luther King Jr. Day - University Closed
February 8	Last Day for Course Withdrawal for Partial Refund
February 23 (Noon)	Undergraduate Student Midterm Grades Due
March 6	No classes

March 8	Last Day for Undergraduate Course Withdrawal - No Refund
March 22	Last Day for Graduate Course Withdrawal - No Refund
March 24	Last Day of Classes (follow Friday schedule)
March 25	Reading Day (no classes)
March 26-28	Final Exam Period
March 28	Term Ends
March 30-April 3	Grading, Assessment & Professional Development for Faculty
April 3 (Noon)	Final Grades Due From Instructors. Final grade processing for the term will be completed by the next BUSINESS day.

Spring 2026

Date	Event
April 3	New Student Orientation (Virtual)
April 4-5	All students move-in
April 6	Classes Begin
April 10 (Noon)	Last Day to Add or Drop Courses
May 3	Last Day for Course Withdrawal for Partial Refund
May 18 (Noon)	Undergraduate Student Midterm Grades Due
May 25	Memorial Day (University Closed)
May 31	Last Day for Undergraduate Course Withdrawal - No Refund
June 14	Last Day for Graduate Course Withdrawal - No Refund
June 15	Last Day of Classes
June 16	Reading Day (no classes)
June 17-19	Final Exam Period
June 19	Term Ends
June 20	Commencement
June 22-26	Grading, Assessment & Professional Development for Faculty
June 26 (Noon)	Final Grades Are Due From Instructors. Final grade processing for the term will be completed by the next BUSINESS day.

ACADEMIC PROGRAMS

Baccalaureate Degree Programs

1. Bachelor of Science in Chemical Engineering (p. 9)
2. Bachelor of Science in Computer Engineering (p. 15)
3. Bachelor of Science in Computer Science (p. 12)
   Concentrations:
   - Computer Gaming
   - Cybersecurity
   - Artificial Intelligence
4. Bachelor of Science in Electrical Engineering (p. 18)
5. Bachelor of Science in Engineering (p. 20)
   Concentrations:
   - Manufacturing Systems
   - Mechatronics Systems
   - Robotic Systems
   - Engineering Management
6. Bachelor of Science in Industrial Engineering (p. 23)
7. Bachelor of Science in Management (p. 32)
   Concentrations:
   - Innovation and Entrepreneurship
   - Sustainability Management
   - Supply Chain and Logistics Management
   - Business Analytics
   - Technology Leadership
8. Bachelor of Science in Mechanical Engineering (p. 26)
   Concentrations:
   - Alternative Energy
   - Automotive Engineering Design
   - Bio-engineering Applications
   - Machine Design & Advanced Materials
9. Bachelor of Science in Semiconductor Materials and Devices (Accelerated)

Minors

1. Acoustics (p. 33)
2. Applied and Computational Mathematics (p. 33)
3. Artificial Intelligence (p. 33)
4. Business (p. 34)
5. Computer Engineering (p. 34)
6. Computer Gaming (p. 34)
7. Computer Science (p. 34)
8. Cybersecurity (p. 34)
9. Economics (p. 35)
10. Electrical Engineering (p. 35)
11. Innovation and Entrepreneurship (p. 35)
12. Manufacturing (p. 35)
13. New Energy
14. Physics (p. 36)
15. Pre-Med (p. 37)
16. Statistics (p. 36)
17. Sustainability (p. 37)

Sunset Programs (Admission to these programs was discontinued and a teach-out plan is in place for current students.)

Bachelor of Science in Applied Biology
Bachelor of Science in Biochemistry
Bachelor of Science in Chemistry
Bachelor of Science in Engineering Physics

College of Engineering and Computer Science

Scott Grasman, Ph.D.

Dean of the College of Engineering and Computer Science
3-105 AB, 810-762-7948
coe@kettering.edu

The College of Engineering and Computer Science is home to the Departments of Chemical Engineering and Materials Science, Electrical and Computer Engineering, Industrial and Manufacturing Engineering, and Mechanical Engineering (p. 26). Programs offered through the college focus on a variety of subject areas, including embedded computer systems, signal processing, control systems, robotics, manufacturing and human processes, safety, bioengineering, automotive design, alternative energy, and much more.

Academic Programs

Chemical Engineering (p. 9)

The Chemical Engineering program is designed to prepare graduates with an understanding of advanced chemistry topics; fun, fundamental material and energy balances for chemical processes, thermodynamics, fluid dynamics and heat transfer, chemical reaction engineering, separations and mass transfer technology, process design, optimization, and control. Students are also exposed to experimental and computational methods related to chemical engineering in a sequential set of courses beginning in their sophomore year. Many of these laboratory courses require students to work in teams to submit written and oral reports or apply computational software to complete their projects. In their senior year, students take part in a capstone design course which allows them to integrate the knowledge acquired from their prior foundational courses. Throughout the curriculum, process safety and health as well as environmental and ethical issues in engineering are incorporated. Chemical engineering elective courses are designed to expose students to applications of chemical engineering - including polymer science and engineering, sustainable engineering design, battery technology, and process safety.

Computer Engineering (p. 15)

Computer Engineering is a discipline that integrates principles of electrical engineering and computer science to design, develop, and maintain hardware and software systems. At Kettering University, the Computer Engineering program prepares students for careers focused on embedded computer system design and implementation with applications that span many industry sectors, including consumer electronics, internet technology, advanced mobility systems, and intelligent manufacturing.

The curriculum includes a broad set of general education courses, a strong sequence of mathematics and basic science courses, and a core Computer Engineering curriculum that covers hardware design, software development in both assembly and higher-level languages, computer networking, and embedded computer applications through a combination of computer engineering, electrical engineering, and computer science courses. Additionally, the program includes a rich selection of technical elective course options that provide breadth and depth to the core topics.

Computer Science (p. 12)

Computer Science is one of the fastest growing majors in the world. Computer scientists are needed in every imaginable industry, from the automotive industry, programming autonomous vehicles to the cybersecurity industry, protecting the world's most sensitive computer systems. Kettering faculty know that our students have to be exposed to state of the art technologies in their curriculum, and our faculty bring their expertise in artificial intelligence, gaming and virtual reality, and cybersecurity right into the classroom. Faculty have designed the Computer Science courses with significant laboratory and project-based content to allow students to deeply explore and personalize the key concepts studied in class. Kettering students have co-op opportunities in top industries, in sectors ranging from e-commerce, automotive, healthcare, and government, and they also have the chance to work directly with faculty on current cutting edge research.

Electrical Engineering (p. 18)

Electrical Engineering is a broad discipline that integrates mathematical and scientific principles of electricity and magnetism to analyze electrical phenomena and to design electrical systems. At Kettering University, the Electrical Engineering program prepares students for a wide range of careers involving the design and implementation of electrical systems through its curriculum, experiential learning, including cooperative education, and co-curricular activities sponsored by the department and the university.

The curriculum includes a broad set of general education courses, a strong sequence of mathematics and basic science courses, and a core Electrical Engineering curriculum that includes fundamental courses in electrical circuits, electronics, electrical signals and systems, electromagnetic fields and waves, digital systems, and embedded computer systems. Additionally, the program includes a rich selection of technical elective course options that provide breadth and depth to the core topics.

Engineering

The Bachelor of Science in Engineering program prepares students for careers in multidisciplinary engineering. The program includes a core set of engineering courses, which provides students with a foundation in Computer, Electrical, Industrial, and Mechanical Engineering principles. Students will then select one of the following concentrations: Engineering Management, Manufacturing Systems, Mechatronics Systems or Robotic Systems.

Industrial Engineering (p. 23)

Virtually every organization – banks, the military, theme parks, airlines, restaurants, retail companies, manufacturers, software companies, and even hospitals – needs industrial engineers to find new ways to improve quality, save money, and increase productivity. And there's no better place to launch your career as an expert in innovation than Kettering. Small classes, state-of-the-art labs, co-op, and experiential learning opportunities—it's no surprise that U.S. News & World Report ranked us at the top for fourteen straight years.

Mechanical Engineering (p. 26)

Mechanical Engineering is a broad field that involves the design, analysis, and manufacture of mechanical systems, energy systems, and dynamic systems. The ME curriculum provides students a sound foundation in engineering, math, and science fundamentals that include hands-on learning experiences, and integrated computational and experimental analysis tools. Additionally, they benefit from broad-based exposure to

the social sciences, including management, leadership, and innovation. Mechanical Engineering students may elect to customize their degree by taking a set of elective courses in a specific area; either by pursuing a concentration within the Mechanical Engineering program or by pursuing a Minor with non-Mechanical Engineering programs.

Semiconductor Materials and Devices

The Bachelor of Science in Semiconductor Materials and Devices prepares students for careers at the forefront of one of the most critical and fast-growing global industries. Grounded in applied science, the program integrates physics, chemistry, materials science, and engineering to build expertise in semiconductor materials, devices, and processing. Through a combination of rigorous coursework, hands-on laboratory experiences, and Kettering's signature co-op program, graduates develop the technical knowledge, problem-solving abilities, and professional skills needed to contribute across the semiconductor supply chain, from materials synthesis and characterization to device fabrication and testing. The program also emphasizes communication, teamwork, and ethical leadership, equipping students to thrive in research labs, advanced manufacturing facilities, and technology firms, while providing a strong foundation for graduate study or careers in related high-tech fields.

Minors

Computer Engineering (p. 34)
Electrical Engineering (p. 35)
Manufacturing (p. 35)
New Energy

Dual Majors

The department heads of the programs have agreed upon a curriculum that satisfies all requirements for the following dual majors. Programs not listed require approval of the appropriate department head(s).

- Computer Engineering & Computer Science
- Electrical Engineering & Computer Science
- Electrical Engineering & Computer Engineering
- Industrial Engineering & Management
- Mechanical Engineering & Electrical Engineering
- Mechanical Engineering & Industrial Engineering

Chemical Engineering

Home Department: Chemical Engineering And Materials Science

Department Head:

Susan Farhat, Ph.D.

Program Overview

Chemical engineers apply the principles of chemistry, math, and physics to the design and operation of large-scale chemical manufacturing processes. They translate processes developed in the lab into practical applications for the production of products such as plastics, medicines, detergents, and fuels; design plants to maximize productivity and minimize costs; and evaluate operations for performance and product quality. Due to the diversity seen in the field, chemical engineers have a broad knowledge of engineering science and environmental regulations, and as a consequence are prepared to manage large scale, multi-disciplinary projects.

The BS in Chemical Engineering is designed to prepare graduates with an understanding of advanced chemistry topics; fundamental material and energy balances for chemical processes; thermodynamics; fluid dynamics and heat transfer; chemical reaction engineering; separations and mass transfer technology; and process design, optimization, and control. Students are also exposed to experimental and computational methods related to chemical engineering, in a sequential set of courses beginning in their sophomore year. Many of these laboratory courses require students to work in teams to submit written and oral reports or apply computational software to complete their projects. In their senior year, students take part in a capstone design course which allows them to integrate the knowledge acquired from their prior foundational courses. Throughout the curriculum, process safety and health as well as environmental and ethical issues in engineering are incorporated. Chemical engineering elective courses are designed to expose students to applications of chemical engineering - including polymer science and engineering, sustainable engineering design, battery technology, and process safety.

Graduates of this program are working in a wide range of industries, including petrochemicals, biotechnology, pharmaceuticals, alternative energy, food, electronics, health, automotive, aerospace, and the environment. Many of them work in product and process engineering, research and development, operations, technical sales, engineering systems design, plant or corporate management, and manufacturing. Common minors that complement the BS in Chemical Engineering degree include Sustainability, Business, Manufacturing, PreMed, and Statistics.

Kettering University's Bachelor of Science in Chemical Engineering is a strong interdisciplinary program that draws on the strengths of our exceptional faculty, curricula, laboratories, and unique co-op component.

The Chemical Engineering program is accredited by the Engineering Accreditation Commission (EAC) of ABET.

Program Educational Objectives

The Chemical Engineering program is designed to provide its graduates a solid educational foundation on which they can build successful and sustainable careers in chemical engineering or a related field. In particular, all graduates of the Chemical Engineering program will:

- Be employed or pursuing an advanced degree in the field of chemical engineering or other related disciplines.
- Be productive members of interdisciplinary teams.
- Assume leadership positions in their industry, their continuing education, or in their communities, as their careers develop.
- Continue their professional development and engage in the life-long learning necessary for a sustainable career.

BS/MASTERS PATHWAY

Undergraduate students also have an opportunity to get their bachelor's and master's degrees in five years with the BS/MASTERS Pathway.

Chemical Engineering Program Curriculum Requirements

Code	Title	Credit Hours
First Year Experience		
CILE-101	First Year Foundations	1
General Education		
COMM-101	Rhetoric & Writing	4
ECON-201	Economic Principles	4
200-level Liberal Arts Electives		8
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Advanced Humanities Electives [1]		4
Advanced Social Science Electives [1]		4
Advanced Humanities or Social Science Elective [1]		4
Total Credit Hours		**33**

[1] Humanities and Social Science advanced electives must be selected from approved 300 and 400 level courses.

Code	Title	Credit Hours
Basic Sciences		
Select one of the following:		4
CHEM-137 & CHEM-136	General Chemistry I and Principles of Chemistry Lab	
CHEM-135 & CHEM-136	Principles of Chemistry and Principles of Chemistry Lab	
CHEM-237 & CHEM-238	General Chemistry II and General Chemistry II Lab	4
CHEM-345 & CHEM-346	Organic Chemistry I and Organic Chemistry I Lab	6
CHEM-347	Organic Chemistry II	4
Advanced Chemistry Elective [3]		4
PHYS-114 & PHYS-115	Newtonian Mechanics and Newtonian Mechanics Laboratory	4
PHYS-224 & PHYS-225	Electricity and Magnetism and Electricity and Magnetism Laboratory	4
	Credit Hours Subtotal:	*30*
Mathematics		
MATH-101	Calculus I	4
or MATH-101X	Calculus I	
MATH-102	Calculus II	4
or MATH-102X	Calculus II	
MATH-203	Multivariate Calculus	4
or MATH-203X	Multivariate Calculus	
MATH-204	Differential Equations & Laplace Transforms	4
MATH-258	Probability and Statistics	4
	Credit Hours Subtotal:	*20*
Engineering Topics		
CHME-100	Introduction to Chemical Engineering	4
CHME-200	Mass & Energy Balance	4
CHME-210	Chemical Engineering Thermodynamics	4
CHME-225	Computing in Chemical Engineering	2
CHME-230	Foundations of Materials	4
CHME-310	Fluid Dynamics and Heat Transfer	4
CHME-325	Fluid Dynamics and Heat Transfer Lab	2
CHME-330	Mass Transfer and Separations	4
CHME-350	Reaction Engineering	4
CHME-425	Separations, Reactions, and Prototyping Lab	2
CHME-430	Process Controls	4
CHME-440	Senior Chemical Engineering Design I	4
Chemical Engineering Program Electives		
Select 2 of the following:		8
CHME-460	Sustainable Engineering Design: Energy and Environment	
CHME-470	Polymer Science & Engineering	
CHME-472	Fundamentals - Battery Systems	
CHME-482	Alternative Fuels	
CHME-491	Chemical Eng. Special Topics	
Electives		
Programming Elective [4]		4
Engineering Elective [5]		4
Technical Electives [6]		8
Free Electives		8
	Credit Hours Subtotal:	*74*
Undergraduate Thesis		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [7]	4

(Minimum) Total Credits Required for Program: 161[2]

[2] The minimum total number of credit hours required for graduation is 161; however, the total number of credit hours taken may exceed 161. All Chemical Engineering majors must meet the general educational requirements and their program's requirements for a minor or concentration.

[3] The Advanced Chemistry Elective must be numbered 300 or higher and cannot be Organic Chemistry I or Organic Chemistry II, since these are are already required courses.

[4] A Programming Elective can be chosen from the following options: IME-211, CS-101, ECE-101, or MECH 211.

[5] An Engineering Elective is any course with the IME, EE, CE, ME, or ECE prefix, 100-level or higher.

[6] A minimum of eight hours of technical electives are required for the Chemical Engineering Degree. A technical elective may be any course numbered 300-599 in BIOL, CE, CHEM, CHME, CS, EE, IME, ISYS, MATH, MECH, or PHYS that is not used to complete core degree requirements. Additional courses that can be used include BUSN-303, BUSN-304, and MGMT-419/619. Other courses may be used but require approval by the Department Head of Chemical Engineering.

[7] Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Representative Program [1,2]

Course	Title	Credit Hours
Freshman I		
CILE-101	First Year Foundations	1
CHEM-137 or CHEM-135	General Chemistry I or Principles of Chemistry	3
CHEM-136	Principles of Chemistry Lab	1
CHME-100	Introduction to Chemical Engineering	4
COMM-101	Rhetoric & Writing	4
MATH-101	Calculus I	4
	Credit Hours	**17**
Freshman II		
CHEM-237	General Chemistry II	3
CHEM-238	General Chemistry II Lab	1
ECON-201	Economic Principles	4
MATH-102	Calculus II	4
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
	Credit Hours	**16**
Sophomore I		
CHME-200	Mass & Energy Balance	4
MATH-203	Multivariate Calculus	4
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
200-level Liberal Arts Elective		4
	Credit Hours	**16**
Sophomore II		
CHME-210	Chemical Engineering Thermodynamics	4
CHME-225	Computing in Chemical Engineering	2
CHEM-345	Organic Chemistry I	4
CHEM-346	Organic Chemistry I Lab	2
MATH-204	Differential Equations & Laplace Transforms	4
	Credit Hours	**16**
Junior I		
CHME-310	Fluid Dynamics and Heat Transfer	4
CHME-325	Fluid Dynamics and Heat Transfer Lab	2
CHEM-347	Organic Chemistry II	4
MATH-258	Probability and Statistics	4
200-level Liberal Arts Elective		4
	Credit Hours	**18**
Junior II		
CHME-230	Foundations of Materials	4
CHME-330	Mass Transfer and Separations	4
CHME-350	Reaction Engineering	4
Programming Elective [4]		4
Advanced Social Science Elective [2]		4
	Credit Hours	**20**
Senior I		
CHME-425	Separations, Reactions, and Prototyping Lab	2
CHME-430	Process Controls	4
Technical Elective [6]		4
Advanced Chemistry Elective [3]		4
Advanced Humanities Elective [2]		4
	Credit Hours	**18**
Senior II		
CHME-440	Senior Chemical Engineering Design I	4
Chemical Engineering Program Elective		4
Engineering Elective [5]		4
Advanced Humanities or Social Science Elective [2]		4
Free Elective		4
	Credit Hours	**20**
Senior III		
Technical Elective [6]		4
Chemical Engineering Program Elective		4
Free Elective		4
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
	Credit Hours	**16**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion	4
	Credit Hours	**4**
	Total Credit Hours	**161**

(Minimum) Total Credits Required for Program: 161[1]

[1] The minimum total number of credit hours required for graduation is 161; however, the total number of credit hours taken may exceed 161. All Chemical Engineering majors must meet the general educational requirements and their program's requirements for a minor or concentration.

[2] Humanities and Social Science electives must be selected from approved 300 or 400 level courses.

[3] The Advanced Chemistry Elective must be numbered 300 or higher and cannot be Organic Chemistry I or Organic Chemistry II, since these are are already required courses.

[4] A Programming Elective can be chosen from the following options: IME-211, CS-101, ECE-101, or MECH 211.

[5] An Engineering Elective is any course with the IME, EE, CE, ME, or ECE prefix, 100-level or higher.

[6] A minimum of 8 hours of technical electives are required for the Chemical Engineering Degree. A technical elective may be any course numbered 300-599 in BIOL, CE, CHEM, CHME, CS, EE, IME, ISYS, MATH, MECH, or PHYS that is not used to complete core degree requirements.

Other courses may be used but require approval by the Department Head of Chemical Engineering.

Computer Science

Home Department: Computer Science

Interim Department Head:

Lisa Gandy, Ph.D.
Room 2-300 AB, 810-762-5768
computerscience@kettering.edu (jgeske@kettering.edu)

Program Overview

Computer Science touches virtually every aspect of human endeavor. Its impact on society is seen in the proliferation of computers, information systems, game systems, web browsers, search engines, computerization and automation of automobiles, and all the wonderful application programs that have been developed to make computers more productive and easier to use. An important aspect of the field deals with how to make programming easier, software more reliable, and the processing and retrieval of information more accessible, but fundamentally, computer science is a science of abstraction - creating the correct models for real-world problems that can be represented and manipulated inside a computer.

Computer scientists are experts in solving complex problems. They use the tools of computation and information representation to devise novel and innovative solutions to these problems. Through this program, students learn these tools in terms of the theory of the fundamental capabilities and limitations of computation, as well as how computation can be practically realized and applied. A computer scientist understands how to design and analyze algorithms that apply computation effectively, and how to represent, store, and retrieve information efficiently, and how to design software systems to solve complex problems.

The program for Computer Science majors is broad and rigorous; students are required to have a solid foundation in computer software, hardware, and theory. Yet, the program is structured in a way that supports in-depth study of areas in and outside the computing field. Numerous technical and free electives give students the opportunity to tailor the degree to their unique interests. Students may opt to take a Concentration in Computer Gaming, Cybersecurity, or Artificial Intelligence by selecting groups of elective courses within these domains. Additionally, students can easily obtain minors in diverse fields such as Computer Engineering, Electrical Engineering, Innovation and Entrepreneurship, and Economics.

A wide variety of exciting professional and academic opportunities exist for graduates of computer science including Software Engineering, Internet Systems and Technology, Security, Hardware Development, Information Systems, Biotechnology, Business, and Consulting, as well as masters and doctoral studies in computing related fields. With the aid of a Computer Science faculty advisor, the computer science student develops a coherent program of study that uniquely supports their career objectives and is true to the aims of a liberal education.

The program in Computer Science is accredited by the Computing Accreditation Commission of ABET.

Computer Science vs. Computer Engineering

Historically, the discipline of computer science draws its roots from two separate disciplines.

- Electrical Engineering: the development of devices that depend on electricity and magnetism.
- Mathematics: the study of the properties and interactions of idealized objects, such as numbers and symbols.

Computer science lies at the intersection of these two disciplines. It is the study of a particular class of electrical devices (i.e. computers) which can perform mathematical, logical operations (i.e. software).

The computer engineering (p. 15) and computer science programs have a common core of classes. Students in both programs study programming, the design of digital systems, computer architecture, and operating systems, as well as a solid foundation in mathematics, science, and general education.

The computer engineering program emphasizes the design and development of physical computer systems. In addition to a common engineering core, students in computer engineering study topics such as the analysis of electrical circuits, and electronics, with an emphasis on electrical and digital design.

The computer science program emphasizes the design and development of software systems. Students in computer science study topics such as algorithms and data structures, software engineering, compiler design, database systems, artificial intelligence, and the theoretical foundations of computation.

Both programs prepare students for work in the computer industry, though with emphasis on different areas. Students should select the program which fits their skills and interests best. Both programs offer minors (p. 33), so students may take additional courses in these areas and have it designated on their transcript.

Program Educational Objectives

1. Computer Science graduates will have sufficient depth of understanding of the fundamental areas of computer science to enable them for success in today's workplace.
2. Computer Science graduates will have sufficient breadth of understanding to enable continued professional development and lifelong learning throughout their careers.
3. Computer Science graduates will have sufficient teamwork, communication, and interpersonal skills to enable them to work with others effectively in their professional careers.
4. Computer Science graduates will be sufficiently prepared to be innovative and ethical leaders in a global society.

BS/MASTERS PATHWAY

Undergraduate students also have an opportunity to get their bachelor's and master's degrees in five years with the BS/MASTERS Pathway.

Computer Science Program Curriculum Requirements

Code	Title	Credit Hours
First Year Experience		
CILE-101	First Year Foundations	1
General Education		
COMM-101	Rhetoric & Writing	4
ECON-201	Economic Principles	4
200-level Liberal Arts Electives		8
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Advanced Humanities Electives [1]		4
Advanced Social Science Electives [1]		4
Advanced Humanities or Social Science Elective [1]		4
Total Credit Hours		**33**

[1] Humanities and Social Science advanced electives must be selected from approved 300 and 400 level courses.

Code	Title	Credit Hours
Basic Science		
Science Electives		8
	Credit Hours Subtotal:	*8*
Computer Science		
CS-101	Computing & Algorithms I	4
CS-102	Computing & Algorithms II	4
CS-203	Computing & Algorithms III	4
CS-211	Discrete Mathematics	4
CS-231	Programming Language Paradigms	4
CS-300	The Computing Professional	4
CS-312	Theory of Computation	4
CS-351	Cloud Computing	4
CS-451	Operating Systems	4
CS-471	Software Engineering	4
Computer Science Technical Electives		16
	Credit Hours Subtotal:	*56*
Computer Engineering		
CE-210	Intro to Digital Systems Design	4
CE-320	Intro to Microcomputers	4
	Credit Hours Subtotal:	*8*
Mathematics		
MATH-101	Calculus I	4
or MATH-101X	Calculus I	
MATH-102	Calculus II	4
or MATH-102X	Calculus II	
or MATH-102H	Calculus II - Honors	
Mathematics Electives		8
	Credit Hours Subtotal:	*16*
Electives		
Free Electives		16
	Credit Hours Subtotal:	*16*
Culminating Undergraduate Experience		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [1]	4
Total Credit Hours		**108**

(Minimum) Total Credits Required for Program: 141

[1] Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Concentrations

The Computer Science concentrations provide students with a technical depth of study in an emerging area of interest. The student's degree remains in Computer Science, and this concentration does not prevent students from working within any government or industry position in the computer science arena. Students interested in the Computer Gaming, Cybersecurity, or Artificial Intelligence concentrations should contact their academic advisor in the Computer Science Department.

Artificial Intelligence

Students majoring in Computer Science may select a concentration in Artificial Intelligence, consisting of the following 16 credit hours of Computer Science technical electives as listed below.

Code	Title	Credit Hours
CS-481	Artificial Intelligence	4
CS-482	Machine Learning	4
Select Two of the following (At least one must be from CS)		8
CS-441	Foundations of Data Science	
CS-465	Information Retrieval and Data Mining	
CS-483	Algorithms for Deep Learning	
CE-442	Mobile Robotics	
CE-452	Artificial Intelligence for Autonomous Driving	
CE-454	Computer Vision for Autonomous Driving	
IME-408	Industrial Robotics	
MGMT-423	Data Analytics	

Computer Gaming

Students majoring in Computer Science may select a concentration in Computer Gaming, consisting of the following 16 credit hours of Computer Science technical electives as listed below.

Code	Title	Credit Hours
Required Courses		
CS-320	Computer Graphics	4
CS-385	Elements of Game Design	4
CS-420	Virtual Reality	4
CS-485	Advanced Game Development	4

Cybersecurity

Students majoring in Computer Science may select a concentration in Cybersecurity, consisting of the following 24 credit hours of Computer Science technical electives as listed below.

Code	Title	Credit Hours
Required Courses		
CS-355	Introduction to Cybersecurity	4
CS-381	Ethical Hacking	4
CS-415	Cryptography	4
CS-457	Wireless and Mobile Security	4
CS-458	Digital Forensics	4
CE-480	Computer Networks	4
Total Credit Hours		**24**

Representative Program

Course	Title	Credit Hours
Freshman I		
CILE-101	First Year Foundations	1
COMM-101	Rhetoric & Writing	4
CS-101	Computing & Algorithms I	4
MATH-101	Calculus I	4
Science Elective [1]		4
	Credit Hours	**17**
Freshman II		
CS-102	Computing & Algorithms II	4
CS-211	Discrete Mathematics	4
MATH-102	Calculus II	4
ECON-201	Economic Principles	4
	Credit Hours	**16**
Sophomore I		
CS-203	Computing & Algorithms III	4
Mathematics Elective		4
200-level Liberal Arts Elective		4
Science Elective [1]		4
	Credit Hours	**16**
Sophomore II		
CE-210	Intro to Digital Systems Design	4
CS-231	Programming Language Paradigms	4
Free Elective		4
200-level Liberal Arts Elective		4
	Credit Hours	**16**
Junior I		
CE-320	Intro to Microcomputers	4
CS-300	The Computing Professional	4
CS Technical Elective [2]		4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**16**
Junior II		
CS-351	Cloud Computing	4
Advanced Humanities or Social Science Elective		4
CS Technical Elective [2]		4
Mathematics Elective		4
	Credit Hours	**16**
Senior I		
CS-312	Theory of Computation	4
Advanced Humanities or Social Science Elective		4
CS Technical Elective [2]		4
Free Electives		4
	Credit Hours	**16**

Senior II		
CS-471	Software Engineering	4
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
CS Technical Elective [2]		4
Free Elective		4
	Credit Hours	**16**
Senior III		
CS-451	Operating Systems	4
Free Elective		4
	Credit Hours	**8**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion	4
	Credit Hours	**4**
	Total Credit Hours	**141**

(Minimum) Total Credits Required for Program: 141

[1] Must include two courses (8 credits) with a laboratory component.
[2] A list of approved technical electives is available from the department and listed on the department web-site. Technical electives must be 300-level or higher.

Computer Engineering

Home Department: Electrical and Computer Engineering

Department Head:

Mark G. Thompson, Ph.D.
Room 2-703 AB, 810-762-7900
ece@kettering.edu

Program Overview

Computer engineering is a branch of engineering concerned with the design, development, and application of computer systems. The Bachelor of Science in Computer Engineering (CE) program at Kettering University focuses on embedded-computer systems, in which a computer chip, module, or circuit board is built into a larger product or system. Examples of products containing embedded computers include “smart” phones, MP3 players, GPS navigation systems, hybrid and electric vehicle drive systems, unmanned vehicles, medical diagnostic devices, and manufacturing systems. Embedded systems applications span a wide range of industry sectors including consumer electronics, internet technology, computer hardware, automotive systems, and automated manufacturing. Computer engineers today can find employment in all these industries, and many more.

The Computer Engineering program is accredited by the Engineering Accreditation Commission (EAC) of ABET.

Program Educational Objectives

The Computer Engineering Program is designed to provide its graduates a solid educational foundation on which they can build successful and sustainable careers in computer engineering or a related field. In particular, graduates of the Computer Engineering Program will:

- Be employed or pursuing an advanced degree in the field of computer engineering or other related disciplines.
- Be productive members of interdisciplinary teams.
- Assume leadership positions in their industry, their continuing education, or in their communities, as their careers develop.
- Continue their professional development and engage in the life-long learning necessary for a sustainable career.

The Computer Engineering program is designed to meet its objectives through its curriculum, experiential learning including cooperative education, and co-curricular activities sponsored by the department and the university.

The curriculum includes a strong sequence of mathematics and basic science courses that provides the solid foundation in these areas that is common to all engineering programs at Kettering University. Engineering design and basic engineering concepts from a variety of disciplines are introduced in the freshman year in IME-100. Basic and practical computer programming and problem solving are introduced, also in the freshman year, in ECE-101.

The “core” curriculum covers hardware design, software development in both assembly and higher-level languages, computer networking, and embedded computer applications through a combination of computer engineering, electrical engineering, and computer science courses. Every course in the core curriculum includes a strong laboratory experience,

a hallmark of the program that both enhances students' learning and hones their abilities to apply technology effectively in the workplace. A flexible selection of electives allow students to deepen their knowledge in specific areas or applications of computer engineering, or to broaden their background through dual majors or minors, or simply well chosen combinations of courses that meet their individual educational goals.

The culminating experience in the curriculum takes place in CE-490, which gives students experience working in a team environment to complete a large engineering project that builds on the knowledge and skills they have gained in their coursework.

The curriculum is supported by modern lab facilities for digital systems, embedded systems, computer networks, virtual reality systems, logic systems, mobile robotics, mobile application development, circuits, and electronics.

BS/MASTERS PATHWAY

Undergraduate students also have an opportunity to get their bachelor's and master's degrees in five years with the BS/MASTERS Pathway.

Computer Engineering Program Curriculum Requirements

Code	Title	Credit Hours
First Year Experience		
CILE-101	First Year Foundations	1
General Education		
COMM-101	Rhetoric & Writing	4
ECON-201	Economic Principles	4
200-level Liberal Arts Electives		8
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Advanced Humanities Electives [1]		4
Advanced Social Science Electives [1]		4
Advanced Humanities or Social Science Elective [1]		4
Total Credit Hours		**33**

[1] Humanities and Social Science advanced electives must be selected from approved 300 and 400 level courses.

Code	Title	Credit Hours
Mathematics and Basic Science		
CS-211	Discrete Mathematics	4
MATH-101	Calculus I	4
or MATH-101X	Calculus I	
MATH-102	Calculus II	4
or MATH-102X	Calculus II	
or MATH-102H	Calculus II - Honors	
MATH-203	Multivariate Calculus	4
or MATH-203X	Multivariate Calculus	
or MATH-203H	Multivariate Calculus - Honors	
MATH-204	Differential Equations & Laplace Transforms	4
or MATH-204H	Differential Equations and Laplace Transforms - Honors	
MATH-258	Probability and Statistics	4
PHYS-114 & PHYS-115	Newtonian Mechanics and Newtonian Mechanics Laboratory	4
PHYS-224 & PHYS-225	Electricity and Magnetism and Electricity and Magnetism Laboratory	4
Math/Science Electives		8
	Credit Hours Subtotal:	*40*
Engineering Topics		
CE-210	Intro to Digital Systems Design	4
CE-320	Intro to Microcomputers	4
CE-420	Microcomputer Systems	4
CE-422	Computer Architecture and Organization	4
CE-426	Real-Time Embedded Systems	4
CE-480	Computer Networks	4
CE-490	Senior CE Design Project	4
ECE-101	MATLAB and C Programming	4
EE-210	Engineering Circuit Analysis 1	4
EE-320	Introduction to Microelectronic Devices and Circuits	4
IME-100	Interdisciplinary Design and Manufacturing	4
Computer Engineering Electives		8
Electrical Engineering Elective		4
Computer Science		
CS-101	Computing & Algorithms I	4
CS-102	Computing & Algorithms II	4
Computer Science Elective		4
	Credit Hours Subtotal:	*68*
Electives		
Free Electives		8
Technical Elective		8
	Credit Hours Subtotal:	*16*
Culminating Undergraduate Experience		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [2]	4
	Credit Hours Subtotal:	*4*
Total Credit Hours		**128**

(Minimum) Total Credits Required for Program: 161

[2] Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Electives

Computer Engineering Electives

A computer engineering elective may be any course with a CE prefix.

Computer Science Electives

A computer science elective may be any course with a CS prefix.

Electrical Engineering Elective

The electrical engineering elective may be any course with an EE prefix.

Free Elective

COMM-435 and MATH-100 are **not** accepted for free elective credit.

Math/Science Electives

A math/science elective may be any course with a BIOL, CHEM, EP, MATH, or PHYS prefix, *except* MATH-100 and EP-235.

Technical Electives

A technical elective may be any course numbered 200-level and above with a BIOL, CE, CHEM, CHME, CS, EE, IME, MATH, MECH, or PHYS prefix, except IME-211, that is not used to complete core degree requirements. Additionally, BUSN-303, BUSN-304, and MGMT-419 also qualify as technical electives.

Representative Program

Course	Title	Credit Hours
Freshman I		
CILE-101	First Year Foundations	1
COMM-101	Rhetoric & Writing	4
ECE-101	MATLAB and C Programming	4
MATH-101	Calculus I	4
Math/Science Elective		4
	Credit Hours	**17**
Freshman II		
ECON-201	Economic Principles	4
IME-100	Interdisciplinary Design and Manufacturing	4
MATH-102	Calculus II	4
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
	Credit Hours	**16**
Sophomore I		
CE-210	Intro to Digital Systems Design	4
MATH-203	Multivariate Calculus	4
200-level Liberal Arts Elective		4
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
	Credit Hours	**16**
Sophomore II		
CE-320	Intro to Microcomputers	4
EE-210	Engineering Circuit Analysis 1	4
200-level Liberal Arts Elective		4
MATH-204	Differential Equations & Laplace Transforms	4
	Credit Hours	**16**
Junior I		
CE-420	Microcomputer Systems	4
CS-101	Computing & Algorithms I	4
EE-320	Introduction to Microelectronic Devices and Circuits	4
MATH-258	Probability and Statistics	4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**20**
Junior II		
CE-422	Computer Architecture and Organization	4
CE-426	Real-Time Embedded Systems	4
CS-102	Computing & Algorithms II	4
CS-211	Discrete Mathematics	4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**20**
Senior I		
CE-480	Computer Networks	4
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Computer Science Elective		4
Electrical Engineering Elective		4
Math/Science Elective		4
	Credit Hours	**20**
Senior II		
CE-490	Senior CE Design Project	4
Computer Engineering Elective		4
Free Elective		4
Technical Elective		4
	Credit Hours	**16**
Senior III		
Advanced Humanities or Social Science Elective		4
Computer Engineering Elective		4
Free Elective		4
Technical Elective		4
	Credit Hours	**16**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion	4
	Credit Hours	**4**
	Total Credit Hours	**161**

(Minimum) Total Credits Required for Program: 161

Electrical Engineering

Home Department: Electrical and Computer Engineering

Department Head:

Mark Thompson, Ph.D.
Room 2-703 AB, 810-762-7900
ece@kettering.edu

Program Overview

Electrical Engineering is a broad engineering discipline that integrates mathematical and scientific principles of electricity and magnetism to analyze electrical phenomena and to design electrical systems. The Electrical Engineering program prepares students for a wide range of careers involving the design and implementation of electrical systems.

The Electrical Engineering program is accredited by the Engineering Accreditation Commission (EAC) of ABET.

Program Educational Objectives

The Electrical Engineering Program is designed to provide its graduates a solid educational foundation on which they can build successful and sustainable careers in electrical engineering or a related field. In particular, graduates of the Electrical Engineering Program will:

- Be employed or pursuing an advanced degree in the field of electrical engineering or other related disciplines.
- Be productive members of interdisciplinary teams.
- Assume leadership positions in their industry, their continuing education, or in their communities, as their careers develop.
- Continue their professional development and engage in the lifelong learning necessary for a sustainable career.

The Electrical Engineering program is designed to meet its objectives through its curriculum, experiential learning, including cooperative education, and co-curricular activities sponsored by the department and the university.

The curriculum includes a strong sequence of mathematics and basic science courses that provides the solid foundation in these areas that is common to all engineering programs at Kettering University. Engineering design and basic engineering concepts from a variety of disciplines are introduced in the freshman year in IME-100. Basic and practical computer programming and problem solving is introduced, also in the freshman year, in ECE-101.

The "core" curriculum includes fundamental courses in electrical circuits, electronics, electrical signals and systems, electromagnetic fields and waves, digital systems, and embedded computer systems. Fully half of the courses in the core curriculum include a strong laboratory experience, which both enhances students' learning and hones their abilities to apply technology effectively in the workplace. A flexible selection of electives allow students to deepen their knowledge in specific areas or applications of electrical engineering, or to broaden their background through dual majors or minors, or simply well chosen combinations of courses that meet their individual educational goals.

The culminating experience in the curriculum takes place in EE-490, which gives students experience working in a team environment to complete a large engineering project that builds on the knowledge and skills they have gained in their coursework.

The curriculum is supported by modern lab facilities for analog and digital circuits and electronics, electrical machines, power electronics, control systems, high-voltage studies, virtual reality systems, and embedded computer systems.

BS/MASTERS PATHWAY

Undergraduate students also have an opportunity to get their bachelor's and master's degrees in five years with the BS/MASTERS Pathway.

Electrical Engineering Program Curriculum Requirements

Code	Title	Credit Hours
First Year Experience		
CILE-101	First Year Foundations	1
General Education		
COMM-101	Rhetoric & Writing	4
ECON-201	Economic Principles	4
200-level Liberal Arts Electives		8
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Advanced Humanities Electives [1]		4
Advanced Social Science Electives [1]		4
Advanced Humanities or Social Science Elective [1]		4
Total Credit Hours		**33**

[1] Humanities and Social Science advanced electives must be selected from approved 300 and 400 level courses.

Code	Title	Credit Hours
Mathematics and Basic Science		
CHEM-135 & CHEM-136	Principles of Chemistry and Principles of Chemistry Lab	4
MATH-101 or MATH-101X	Calculus I Calculus I	4
MATH-102 or MATH-102X	Calculus II Calculus II	4
MATH-203 or MATH-203X	Multivariate Calculus Multivariate Calculus	4
MATH-204	Differential Equations & Laplace Transforms	4
MATH-258	Probability and Statistics	4
MATH-307	Matrix Algebra	4
PHYS-114 & PHYS-115	Newtonian Mechanics and Newtonian Mechanics Laboratory	4
PHYS-224 & PHYS-225	Electricity and Magnetism and Electricity and Magnetism Laboratory	4
Math/Science Elective		4
	Credit Hours Subtotal:	*40*
Engineering Topics		

CE-210	Intro to Digital Systems Design	4
CE-320	Intro to Microcomputers	4
ECE-101	MATLAB and C Programming	4
EE-210	Engineering Circuit Analysis 1	4
EE-240	Electromagnetic Fields and Applications	4
EE-310	Engineering Circuit Analysis II	4
EE-320	Introduction to Microelectronic Devices and Circuits	4
EE-336	Continuous-Time Signals and Systems	4
EE-338	Discrete-Time Signals and Systems	4
EE-432	Feedback Control Systems	4
EE-490	Senior Electrical Engineering Design Project	4
IME-100	Interdisciplinary Design and Manufacturing	4
Electrical Engineering Electives		8
Upper Level Electrical Engineering Elective (400 level)		4
Electrical or Computer Engineering Elective		4
	Credit Hours Subtotal:	*64*
Electives		
Free Electives		8
Technical Electives		12
	Credit Hours Subtotal:	*20*
Culminating Undergraduate Experience		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [2]	4
Total Credit Hours		**128**

(Minimum) Total Credits Required for Program: 161

[2] Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Electives

Electrical Engineering Electives

An electrical engineering elective may be any course with an EE prefix. At least 4 credits of electrical engineering electives must be at the 400 level.

Electrical or Computer Engineering Electives

The electrical or computer engineering elective may be an electrical engineering elective or any course with a CE prefix.

Free Elective

COMM-435 and MATH-100 are NOT accepted for free elective credit.

Math/Science Elective

The math/science elective may be CS-211, or any course with a BIOL, CHEM, EP, MATH, or PHYS prefix, *except* MATH-100 and EP-235.

Technical Electives

A technical elective may be any course numbered 200-level and above with a BIOL, CE, CHEM, CHME, CS, EE, IME, MATH, MECH, or PHYS prefix that is not used to complete core degree requirements. Additionally, CS-101, CS-102, BUSN-303, BUSN-304, and MGMT-419 also qualify as technical electives.

Representative Program

Course	Title	Credit Hours
Freshman I		
CILE-101	First Year Foundations	1
CHEM-135	Principles of Chemistry	3
CHEM-136	Principles of Chemistry Lab	1
COMM-101	Rhetoric & Writing	4
ECE-101	MATLAB and C Programming	4
MATH-101	Calculus I	4
	Credit Hours	**17**
Freshman II		
ECON-201	Economic Principles	4
IME-100	Interdisciplinary Design and Manufacturing	4
MATH-102	Calculus II	4
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
	Credit Hours	**16**
Sophomore I		
CE-210	Intro to Digital Systems Design	4
200-level Liberal Arts Elective		4
MATH-203	Multivariate Calculus	4
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
	Credit Hours	**16**
Sophomore II		
EE-210	Engineering Circuit Analysis 1	4
EE-240	Electromagnetic Fields and Applications	4
200-level Liberal Arts Elective		4
MATH-204	Differential Equations & Laplace Transforms	4
	Credit Hours	**16**
Junior I		
EE-310	Engineering Circuit Analysis II	4
EE-320	Introduction to Microelectronic Devices and Circuits	4
EE-336	Continuous-Time Signals and Systems	4
MATH-307	Matrix Algebra	4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**20**
Junior II		
CE-320	Intro to Microcomputers	4
EE-338	Discrete-Time Signals and Systems	4
MATH-258	Probability and Statistics	4
Advanced Humanities or Social Science Elective		4
Electrical Engineering Elective		4
	Credit Hours	**20**

Senior I		
EE-432	Feedback Control Systems	4
Advanced Humanities or Social Science Elective		4
Electrical or Computer Engineering Elective		4
Math/Science Elective		4
Technical Elective		4
	Credit Hours	**20**
Senior II		
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Electrical Engineering Elective		4
Free Elective		4
Technical Elective		4
	Credit Hours	**16**
Senior III		
EE-490	Senior Electrical Engineering Design Project	4
Free Elective		4
Upper Level Electrical Engineering Elective		4
Technical Elective		4
	Credit Hours	**16**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion	4
	Credit Hours	**4**
	Total Credit Hours	**161**

(Minimum) Total Credits Required for Program: 161

Engineering

Program Director:

Dr. David Foster, Ph.D.
Room 2-703 AB, 810-762-7958
dfoster@kettering.edu

Program Overview

The Bachelor of Science in Engineering program prepares students for careers in multidisciplinary engineering. The program includes a core set of engineering courses, which provides students with a foundation in Computer, Electrical, Industrial, and Mechanical Engineering principles. Students will then select one of the following concentrations:

- Engineering Management
- Manufacturing Systems
- Mechatronics Systems
- Robotic Systems

Program Educational Objectives

With their Kettering education as a foundation, within a few years of graduation, graduates will attain:

- A reputation for working effectively and ethically in diverse professional environments.
- Leadership in their profession while actively pursuing lifelong learning and contributing to progress within their field.
- The ability to practice responsible decision-making and apply best practices to their professional endeavors.

BS/MASTERS PATHWAY

Undergraduate students also have the opportunity to earn their bachelor's and master's degrees in five years through the BS/MASTERS Pathway.

Engineering Program Curriculum Requirements

Code	Title	Credit Hours
First Year Experience		
CILE-101	First Year Foundations	1
General Education		
COMM-101	Rhetoric & Writing	4
ECON-201	Economic Principles	4
200-level Liberal Arts Electives		8
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Advanced Humanities Electives [1]		4
Advanced Social Science Electives [1]		4
Advanced Humanities or Social Science Elective [1]		4
Total Credit Hours		**33**

[1] Humanities and Social Science advanced electives must be selected from approved 300 and 400 level courses.

Code	Title	Credit Hours
Mathematics and Basic Science		
MATH-101	Calculus I	4
or MATH-101X	Calculus I	
MATH-102	Calculus II	4
or MATH-102X	Calculus II	
MATH-203	Multivariate Calculus	4
or MATH-203X	Multivariate Calculus	
MATH-258	Probability and Statistics	4
CHEM-135	Principles of Chemistry	3
or CHEM-137	General Chemistry I	
CHEM-136	Principles of Chemistry Lab	1
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
Math/Science Elective		4
	Credit Hours Subtotal:	*32*
Engineering Fundamentals Core		
IME-100	Interdisciplinary Design and Manufacturing	4
ECE-100	Principles of Electrical and Computer Engineering	4
IME-200	Introduction to Industrial Engineering	4
IME-351	Engineering Economics	4
ECE-101	MATLAB and C Programming	4
or CS-101	Computing & Algorithms I	
EE-210	Engineering Circuit Analysis 1	4
MECH-210	Statics	4
MECH-310	Dynamics	4
	Credit Hours Subtotal:	*32*
Concentration - See Below		**52**
	Credit Hours Subtotal:	*52*
Free Electives		**8**
	Credit Hours Subtotal:	*8*
Culminating Undergraduate Experience		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [1]	4
	Credit Hours Subtotal:	*4*
Total Credit Hours		**128**

(Minimum) Total Credits Required for Program: 161

[1] Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Manufacturing Systems Concentration

Code	Title	Credit Hours
IME-300	Manufacturing Processes	4
MATH-204	Differential Equations & Laplace Transforms	4
MATH-305	Numerical Methods and Matrices	4
MECH-211	Circuits and Mechatronics	4
MECH-212	Mechanics of Materials	4
MECH-300	Computer Aided Engineering	4
MECH-307	Materials Engineering	4
Select Two of the Following:		8
IME-403	Computer Numerical Control Machining	
IME-408	Industrial Robotics	
IME-412	Applied Control Systems Design	
Select Three of the Following:		12
CE-472	VR Systems: Modeling & Control	
CE-484	Internet of Things (IoT)	
CS-355	Introduction to Cybersecurity	
IME-361	Lean Work Design	
IME-422	Simulation	
IME-465	Human-Computer Interaction and Interface Design	
IME-471	Quality Control	
IME-473	Design of Experiments	
IME-476	Lean Six Sigma	
MECH-312	Mechanical Component Design I	
MECH-482	Mechanics and Design Simulation of Fiber-Reinforced Composite Materials	
ENGR-490	Senior Multidisciplinary Engineering Design Project	4
Total Credit Hours		**52**

Mechatronic Systems Concentration

Code	Title	Credit Hours
MATH-204	Differential Equations & Laplace Transforms	4
MATH-305	Numerical Methods and Matrices	4
EE-320	Introduction to Microelectronic Devices and Circuits	4
EE-338	Discrete-Time Signals and Systems	4
CE-210	Intro to Digital Systems Design	4
CE-320	Intro to Microcomputers	4
MECH-211	Circuits and Mechatronics	4
MECH-311	Mechatronics Systems Design	4
MECH-330 & MECH-331	Dynamic Systems with Vibrations and Dynamic Sys w Vibrations Lab	4
MECH-430 & MECH-431	Dynamic Systems with Controls and Dynamic Systems with Controls Lab	4
Select Two of the Following:		8
CE-442	Mobile Robotics	

CE-452	Artificial Intelligence for Autonomous Driving	
CE-454	Computer Vision for Autonomous Driving	
CE-472	VR Systems: Modeling & Control	
CE-484	Internet of Things (IoT)	
EE-336	Continuous-Time Signals and Systems	
EE-421	Energy Storage Systems with EV Applications	
EE-434	Digital Signal Processing	
IME-408	Industrial Robotics	
IME-412	Applied Control Systems Design	
ENGR-490	Senior Multidisciplinary Engineering Design Project	4
Total Credit Hours		**52**

Robotic Systems Concentration

Code	Title	Credit Hours
MATH-204	Differential Equations & Laplace Transforms	4
MATH-305	Numerical Methods and Matrices	4
EE-320	Introduction to Microelectronic Devices and Circuits	4
EE-338	Discrete-Time Signals and Systems	4
CE-210	Intro to Digital Systems Design	4
CE-320	Intro to Microcomputers	4
CE-420	Microcomputer Systems	4
CE-426	Real-Time Embedded Systems	4
CE-442	Mobile Robotics	4
IME-408	Industrial Robotics	4
Select Two of the Following:		8
CE-452	Artificial Intelligence for Autonomous Driving	
CE-454	Computer Vision for Autonomous Driving	
CE-472	VR Systems: Modeling & Control	
CE-484	Internet of Things (IoT)	
EE-421	Energy Storage Systems with EV Applications	
EE-434	Digital Signal Processing	
EE-336	Continuous-Time Signals and Systems	
IME-412	Applied Control Systems Design	
IME-465	Human-Computer Interaction and Interface Design	
ENGR-490	Senior Multidisciplinary Engineering Design Project	4
Total Credit Hours		**52**

Engineering Management Concentration

Code	Title	Credit Hours
MATH-350	Financial Mathematics	4
IME-321	Operations Research - Deterministic Models	4
IME-332	Engineering Statistics	4
IME-452	Production System Design	4
IME-453	Supply Chain Design	4
IME-484	Engineering Ethics	4
Select one of the following		4
IME-471	Quality Control	
IME-476	Lean Six Sigma	
Select Five of the following:		20
BUSN-303	New Venture Creation: Entrepreneurship	
BUSN-304	Innovation Development	
BUSN-331	Financial Management	
BUSN-402	Business Law	
MGMT-205	Organizational Behavior	
MGMT-419	Project Management	
MGMT-424	Data Visualization	
MGMT-465	Strategic Management	
MGMT-479	Leadership	
ENGR-490	Senior Multidisciplinary Engineering Design Project	4
Total Credit Hours		**52**

Course	Title	Credit Hours
Freshman		
Freshman I		
CILE-101	First Year Foundations	1
COMM-101	Rhetoric & Writing	4
CHEM-135	Principles of Chemistry	3
CHEM-136	Principles of Chemistry Lab	1
MATH-101	Calculus I	4
IME-100 or ECE-100	Interdisciplinary Design and Manufacturing or Principles of Electrical and Computer Engineering	4
	Credit Hours	**17**
Freshman II		
IME-100 or ECE-100	Interdisciplinary Design and Manufacturing or Principles of Electrical and Computer Engineering	4
200-level Liberal Arts Elective		4
MATH-102	Calculus II	4
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
	Credit Hours	**16**
Sophomore		
Sophomore I		
ECON-201	Economic Principles	4
ECE-101	MATLAB and C Programming	4
MATH-203	Multivariate Calculus	4
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
	Credit Hours	**16**

Sophomore II		
EE-210	Engineering Circuit Analysis 1	4
IME-200	Introduction to Industrial Engineering	4
MECH-210	Statics	4
CONCENTRATION COURSE ONE		4
	Credit Hours	**16**
Junior		
Junior I		
MATH-258	Probability and Statistics	4
MECH-310	Dynamics	4
CONCENTRATION COURSE TWO		4
CONCENTRATION COURSE THREE		4
200-level Liberal Arts Elective		4
	Credit Hours	**20**
Junior II		
IME-351	Engineering Economics	4
CONCENTRATION COURSE FOUR		4
CONCENTRATION COURSE FIVE		4
CONCENTRATION COURSE SIX		4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**20**
Senior		
Senior I		
CONCENTRATION COURSE SEVEN		4
CONCENTRATION COURSE EIGHT		4
CONCENTRATION COURSE NINE		4
Free Elective		4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**20**
Senior II		
CONCENTRATION COURSE TEN		4
CONCENTRATION COURSE ELEVEN		4
Math/Science Elective		4
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
	Credit Hours	**16**
Senior III		
CONCENTRATION COURSE TWELVE		4
Advanced Humanities or Social Science Elective		4
Free Elective		4
ENGR-490	Senior Multidisciplinary Engineering Design Project	4
	Credit Hours	**16**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion	4
	Credit Hours	**4**
	Total Credit Hours	**161**

Industrial Engineering

Home Department: Industrial and Manufacturing Engineering

Interim Department Head:

Dr. Farnaz Ghazi-Nezami
Room 2-212A, AB, 810-762-7974
ime@kettering.edu

Program Overview

The Department of Industrial & Manufacturing Engineering offers a Bachelor of Science in Industrial Engineering (IE). The department emphasizes the development of the student's ability to analyze operational requirements and to design processes that systematically integrate customer needs, technology, and economic and social factors for industrial, service, and governmental organizations.

Industrial Engineering is a discipline known for its breadth of scope and application. The preparation received in industrial engineering is valuable to virtually all industrial, commercial and governmental entities that are engaged in manufacture of a product or provision of a service. Graduates typically are responsible for the design of integrated systems at one of two levels.

The first level may be described as the "human activity systems" level and is concerned with design of the physical workplace at which human activity occurs. The second level, the "management control system" level, is concerned with planning, measuring, and controlling the activities of the organization for optimal utilization of its resources. The use of computers and the development of the associated software are integral parts of both levels of systems design. Industrial Engineers are concerned with systematic design and integration of people, raw materials, facilities, information, and energy to produce safe and quality products and/or services at an affordable cost to the consumer.

The Industrial Engineering curriculum develops the engineering theory, the practical background, and the people skills necessary to design optimal productive work and management control systems for an organization. The Industrial Engineering curriculum is designed to provide the student with a sound theoretical background while being oriented toward applied problem-solving. Classroom instruction is backed by hands-on application in well-equipped laboratory facilities including Robotics, Additive Manufacturing, Applied Control Systems, Work Design, Human Factors (Ergonomics), Manufacturing Processes, Methods Analysis, and Simulation Modeling.

The Industrial Engineering program is accredited by the Engineering Accreditation Commission (EAC) of ABET.

Program Educational Objectives

Within a few years of graduation, Bachelor of Science in Industrial Engineering graduates will have attained:

- The ability to apply current principles of Industrial Engineering to solve complex, real-world problems and overcome challenges facing themselves, their organizations, and the community.
- Exemplary teamwork and leadership skills, growing professionally and increasing their level of responsibility and authority.
- The ability and motivation to expand their knowledge and technological skillset throughout their lives and careers.

Dual Majors

Coordinated programs are available to earn both a Bachelor of Science in Industrial Engineering and a Bachelor of Science in other fields such as Management, Chemical Engineering, Computer Science, and Mechanical Engineering. Generally, completing such a program requires one or two additional academic terms at Kettering University. It is the student's responsibility to determine that all requirements are satisfied for both programs. The student must be advised by both programs each term.

Minors

Many academic departments offer minors (p. 33). For a list of minors see Academic Programs, Minors.

BS/MASTERS PATHWAY

Undergraduate students also have an opportunity to get their bachelor's and master's degrees in five years with the BS/MASTERS Pathway.

Industrial Engineering Program Curriculum Requirements

Code	Title	Credit Hours
First Year Experience		
CILE-101	First Year Foundations	1
General Education		
COMM-101	Rhetoric & Writing	4
ECON-201	Economic Principles	4
200-level Liberal Arts Electives		8
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Advanced Humanities Electives [1]		4
Advanced Social Science Electives [1]		4
Advanced Humanities or Social Science Elective [1]		4
Total Credit Hours		**33**

[1] Humanities and Social Science advanced electives must be selected from approved 300 and 400 level courses.

Code	Title	Credit Hours
Mathematics and Basic Sciences		
CHEM-135 & CHEM-136	Principles of Chemistry and Principles of Chemistry Lab	4
MATH-101	Calculus I	4
or MATH-101X	Calculus I	
MATH-102	Calculus II	4
or MATH-102X	Calculus II	
MATH-203	Multivariate Calculus	4
or MATH-203X	Multivariate Calculus	
Select one of the following:		4
MATH-204	Differential Equations & Laplace Transforms	
MATH-307	Matrix Algebra	
MATH-258	Probability and Statistics	4
IME-332	Engineering Statistics	4
PHYS-114 & PHYS-115	Newtonian Mechanics and Newtonian Mechanics Laboratory	4
PHYS-224 & PHYS-225	Electricity and Magnetism and Electricity and Magnetism Laboratory	4
Science or Math Electives [1]		4
	Credit Hours Subtotal:	*40*
Engineering Topics		
IME-100	Interdisciplinary Design and Manufacturing	4
IME-200	Introduction to Industrial Engineering	4
IME-211	Algorithms and Computer Programming	4
IME-300	Manufacturing Processes	4
IME-321	Operations Research - Deterministic Models	4
IME-351	Engineering Economics	4
IME-361	Lean Work Design	4
IME-422	Simulation	4
IME-452	Production System Design	4
IME-453	Supply Chain Design	4
IME-454	Senior Design Project	4
MECH-210	Statics	4
	Credit Hours Subtotal:	*48*
IE Program Electives		
Select one of the following Human Factors requirements:		4
IME-462	Ergonomics	
IME-463	Safety and Human Factors	
IME-464	Cognitive Work	
or PSYC-350	Cognitive Psychology	
IME-465	Human-Computer Interaction and Interface Design	
Select one of the following Manufacturing requirements:		4
IME-403	Computer Numerical Control Machining	
IME-408	Industrial Robotics	
IME-412	Applied Control Systems Design	
IME-414	Design for Manufacturing and Assembly	
IME-416	Additive Manufacturing	
Select one of the following Quality & Statistics requirements:		4
IME-471	Quality Control	
IME-473	Design of Experiments	
IME-476	Lean Six Sigma	
IME Electives [2]		8
	Credit Hours Subtotal:	*20*
Electives		
Technical Electives [3]		8
Free Electives		8
	Credit Hours Subtotal:	*16*
Culminating Undergraduate Experience		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [4]	4

	Credit Hours Subtotal:	*4*
Total Credit Hours		**128**

(Minimum) Total Credits Required for Program: 161

1 The Science or Math Elective may be any course with a MATH, CHEM, PHYS or BIOL prefix except MATH-100. Students taking CHEM-135 may not take CHEM-137 as a Science Elective.

2 IME electives include any IME course not already used to satisfy degree requirements. IME 484-Engineering Ethics counts as an IME or technical elective.

3 Technical electives include any CE, CHME, CS, ECE, EE, IME, MATH or MECH course not already used to satisfy degree requirements. One must be 200-level or higher and one must be 300-level or higher. Only one MATH course can be used as a technical elective.

4 Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Representative Program

Course	Title	Credit Hours
Freshman I		
CILE-101	First Year Foundations	1
CHEM-135	Principles of Chemistry	3
CHEM-136	Principles of Chemistry Lab	1
COMM-101	Rhetoric & Writing	4
IME-100	Interdisciplinary Design and Manufacturing	4
MATH-101	Calculus I	4
	Credit Hours	**17**
Freshman II		
IME-200	Introduction to Industrial Engineering	4
IME-211	Algorithms and Computer Programming	4
MATH-102	Calculus II	4
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
	Credit Hours	**16**
Sophomore I		
ECON-201	Economic Principles	4
IME-300	Manufacturing Processes	4
MATH-203	Multivariate Calculus	4
MATH-258	Probability and Statistics	4
	Credit Hours	**16**
Sophomore II		
IME-351	Engineering Economics	4
IME-361	Lean Work Design	4
200-level Liberal Arts Elective		4
MATH-204 or MATH-307	Differential Equations & Laplace Transforms or Matrix Algebra	4
	Credit Hours	**16**
Junior I		
IME-321	Operations Research - Deterministic Models	4
IME-332	Engineering Statistics	4
200-level Liberal Arts Elective		4
MECH-210	Statics	4
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
	Credit Hours	**20**
Junior II		
Advanced Humanities or Social Science Elective		4
Technical Elective		4
IE Program Elective (Ergonomics, Manufacturing, or Quality & Statistics)		4
IME-452	Production System Design	4
	Credit Hours	**16**
Senior I		
Math or Science Elective		4
Technical Elective		4
IME-422	Simulation	4
IME-453	Supply Chain Design	4
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
	Credit Hours	**20**
Senior II		
Advanced Humanities or Social Science Elective		4
IE Program Elective (Ergonomics, Manufacturing, or Quality & Statistics)		4
IE Program Elective (Ergonomics, Manufacturing, or Quality & Statistics)		4
IME Elective		4
Free Elective		4
	Credit Hours	**20**
Senior III		
Advanced Humanities or Social Science Elective		4
IME Elective		4
Free Elective		4
IME-454	Senior Design Project	4
	Credit Hours	**16**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion	4
	Credit Hours	**4**
	Total Credit Hours	**161**

(Minimum) Total Credits Required for Program: 161

Mechanical Engineering

Home Department: Mechanical Engineering

Department Head:

Javad Baqersad, Ph.D

Program Overview

The Bachelor of Science in Mechanical Engineering (ME) prepares students for a broad range of careers associated with the design and implementation of mechanical systems involving the conversion, transmission, and utilization of energy. Mechanical engineering courses that provide breadth in the discipline include design, dynamics, engineering materials, thermodynamics, fluid mechanics, heat transfer, vibrations, systems analysis, and associated laboratories. Large and well-equipped laboratories in mechatronics, heat transfer, fluid mechanics, engines, vibrations, instrumentation, fuel cells, and automotive driving support the mechanical engineering program.

Mechanical Engineering students may elect to customize their degree by taking a set of elective courses in a specific area; either by pursuing a concentration within the Mechanical Engineering program or by pursuing a Minor (p. 33) with non-Mechanical Engineering programs. For more details see Mechanical Engineering Program Concentrations (p. 27) or Minors (p. 33).

The Mechanical Engineering program is accredited by the Engineering Accreditation Commission (EAC) of ABET.

Program Educational Objectives

With their Kettering education as a foundation, within a few years of graduation, graduates will attain:

- A reputation for working effectively and ethically in diverse professional environments.
- Leadership in their profession while actively pursuing lifelong learning and contributing to progress within their field.
- The ability to practice responsible decision making and apply best practices to their professional endeavors.

BS/MASTERS PATHWAY

Undergraduate students also have an opportunity to get their bachelor's and master's degrees in five years with the BS/MASTERS Pathway.

Mechanical Engineering Program Curriculum Requirements

Code	Title	Credit Hours
First Year Experience		
CILE-101	First Year Foundations	1
General Education		
COMM-101	Rhetoric & Writing	4
ECON-201	Economic Principles	4
200-level Liberal Arts Electives		8
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Advanced Humanities Electives [1]		4
Advanced Social Science Electives [1]		4
Advanced Humanities or Social Science Elective [1]		4
Total Credit Hours		**33**

[1] Humanities and Social Science advanced electives must be selected from approved 300 and 400 level courses.

Code	Title	Credit Hours
Mathematics and Basic Science		
CHEM-135 & CHEM-136	Principles of Chemistry and Principles of Chemistry Lab	4
MATH-101	Calculus I	4
or MATH-101X	Calculus I	
MATH-102	Calculus II	4
or MATH-102H	Calculus II - Honors	
or MATH-102X	Calculus II	
MATH-203	Multivariate Calculus	4
or MATH-203H	Multivariate Calculus - Honors	
or MATH-203X	Multivariate Calculus	
MATH-204	Differential Equations & Laplace Transforms	4
or MATH-204H	Differential Equations and Laplace Transforms - Honors	
MATH-258	Probability and Statistics	4
MATH-305	Numerical Methods and Matrices	4
PHYS-114 & PHYS-115	Newtonian Mechanics and Newtonian Mechanics Laboratory	4
PHYS-224 & PHYS-225	Electricity and Magnetism and Electricity and Magnetism Laboratory	4
Math/Science Elective [1]		4
	Credit Hours Subtotal:	*40*
Engineering Topics		
IME-100	Interdisciplinary Design and Manufacturing	4
MECH-111	Computer Programming for MEs	4
MECH-210	Statics	4
MECH-211	Circuits and Mechatronics	4
MECH-212	Mechanics of Materials	4
MECH-300	Computer Aided Engineering	4
MECH-307	Materials Engineering	4
MECH-310	Dynamics	4
MECH-311	Mechatronics Systems Design	4
MECH-312	Mechanical Component Design I	4
MECH-320	Thermodynamics	4
MECH-322	Fluid Mechanics	4
MECH-330 & MECH-331	Dynamic Systems with Vibrations and Dynamic Sys w Vibrations Lab	4
MECH-420	Heat Transfer	4
MECH-430 & MECH-431	Dynamic Systems with Controls and Dynamic Systems with Controls Lab	4
MECH-493	Senior Design 1	4

	Credit Hours Subtotal:	*64*
Electives		
Two Free Electives		8
Two Mechanical Engineering Electives [2]		8
Mechanical Engineering Senior Design Project		4
	Credit Hours Subtotal:	*20*
Culminating Undergraduate Experience		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [3]	4
Total Credit Hours		**128**

(Minimum) Total Credits Required for the Program: 161

[1] Math/Science elective is described as: Any level BIOL, CHEM, MATH or PHYS that is not used to complete core degree requirements.

[2] ME electives are described as: Any 300-599 level BIOL, CE, CHEM, CHME, CS, ECE, EE, EP, IME, ISYS, MATH (except pre-calc and college math), MECH, or PHYS that is not used to complete core degree requirements. In addition, BUSN-303, BUSN-304 and MGMT-419 also qualify as M.E. Electives.

[3] Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Mechanical Engineering Concentrations

Students majoring in Mechanical Engineering may select a concentration consisting of 20 credit hours of courses focused in a particular area. Concentrations may include both required and elective courses. The first six terms are common to all Mechanical Engineering students. Senior I through Senior III representative programs are given for each concentration.

A Mechanical Engineering concentration provides students a depth of study in preparation for a career within an industrial sector and/or as a foundation for graduate study. However, the student's degree is Mechanical Engineering and the selected concentration does not prevent students from working within any industry. The primary advantage is to provide a "jump start" over mechanical engineering graduates from other schools with traditional degree programs. Courses are subject to cancellation due to low enrollment.

Alternative Energy Concentration

Code	Title	Credit Hours
MECH-495	Senior Design Project	4
MECH-426	Fuel Cell Science and Engineering	4
MECH-427	Energy and the Environment	4
MECH-428	Bio and Renewable Energy	4
MECH-445	Hybrid Electric Vehicle Propulsion	4
	Credit Hours Subtotal:	*20*

Automotive Engineering Design Concentration

Code	Title	Credit Hours
MECH-448	Vehicle Design Project	4
Select four of the following:		16
MECH-416	Introduction to Finite Element Analysis with Structural Applications	
MECH-426	Fuel Cell Science and Engineering	
MECH-440	Introduction to Internal Combustion Engines	
MECH-441	Advanced Automotive Power Systems	
MECH-442	Chassis Systems	
MECH-444	Introduction to Automotive Powertrains	
MECH-445	Hybrid Electric Vehicle Propulsion	
MECH-446	Vehicle Systems Dynamics	
MECH-450	Automotive Bioengineering: Occupant Protection and Safety	
MECH-451	Vehicular Crash Dynamics and Accident Reconstruction	
	Credit Hours Subtotal:	*20*
Other courses with the approval of the automotive faculty		

Bioengineering Applications Concentration

Code	Title	Credit Hours
Required Courses		
MECH-350	Introduction to Bioengineering Applications	4
MECH-495	Senior Design Project	4
Electives		
Select three of the following:		12
BIOL-141 & BIOL-142	General Biology and General Biology Lab	
BIOL-241 & BIOL-242	Human Biology and Human Biology Lab	
BIOL-341	Anatomy and Physiology	
MECH-450	Automotive Bioengineering: Occupant Protection and Safety	
MECH-451	Vehicular Crash Dynamics and Accident Reconstruction	
PHYS-354	Medical Physics Principles	
	Credit Hours Subtotal:	*20*

Machine Design & Advanced Materials Concentration

Code	Title	Credit Hours
MECH-416	Introduction to Finite Element Analysis with Structural Applications	4
MECH-482	Mechanics and Design Simulation of Fiber-Reinforced Composite Materials	4
MECH-495	Senior Design Project	4
Two MDAM Concentration Related Electives		8

Course	Title	Credit Hours
Freshman I		
CILE-101	First Year Foundations	1
CHEM-135	Principles of Chemistry	3
CHEM-136	Principles of Chemistry Lab	1
COMM-101	Rhetoric & Writing	4

IME-100	Interdisciplinary Design and Manufacturing	4
MATH-101	Calculus I	4
	Credit Hours	**17**
Freshman II		
MATH-102	Calculus II	4
MECH-111	Computer Programming for MEs	4
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
200-level Liberal Arts Elective		4
	Credit Hours	**16**
Sophomore I		
ECON-201	Economic Principles	4
MATH-203	Multivariate Calculus	4
MECH-210	Statics	4
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
	Credit Hours	**16**
Sophomore II		
MATH-204	Differential Equations & Laplace Transforms	4
MECH-307	Materials Engineering	4
MECH-211	Circuits and Mechatronics	4
MECH-212	Mechanics of Materials	4
200-level Liberal Arts Elective		4
	Credit Hours	**20**
Junior I		
MATH-305	Numerical Methods and Matrices	4
MECH-312	Mechanical Component Design I	4
Advanced Humanities or Social Science Elective		4
Math/Science Elective		4
	Credit Hours	**16**
Junior II		
MATH-258	Probability and Statistics	4
MECH-300	Computer Aided Engineering [2]	4
MECH-310	Dynamics	4
MECH-320	Thermodynamics	4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**20**
Senior I		
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
MECH-311	Mechatronics Systems Design	4
MECH-322	Fluid Mechanics	4
MECH-330 & MECH-331	Dynamic Systems with Vibrations and Dynamic Sys w Vibrations Lab	4
	Credit Hours	**16**
Senior II		
MECH-420	Heat Transfer	4
MECH-430 & MECH-431	Dynamic Systems with Controls and Dynamic Systems with Controls Lab	4
MECH-493	Senior Design 1	4
Free Elective		4
ME Elective		4
	Credit Hours	**20**
Senior III		
MECH-495 or MECH-448	Senior Design Project or Vehicle Design Project	4
Free Elective		4
ME Elective		4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**16**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [5]	4
	Credit Hours	**4**
	Total Credit Hours	**161**

1 Approximately one-half of the students take MECH-111 Freshman I and IME-100 Freshman II, the other one-half take IME-100 Freshman I and MECH-111 Freshman II.

2 Approximately one-half of students take MECH-300 Junior II and MECH-311 Junior I, the other one-half take MECH-311 Junior II and MECH-300 Senior I.

3 Elective courses may vary in lecture and/or laboratory credits and terms from those shown. Math/Science electives are any level MATH, BIOL, CHEM, or PHYS course that is not used to complete core degree requirements.

4 ME Senior Design Projects may vary in lecture and/or laboratory credits and terms from those shown.

5 Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Bachelor of Science in Mechanical Engineering Curriculum by Concentration

Alternative Energy Concentration

Freshman I through Junior II Representative Program Credit Total: **105**

Course	Title	Credit Hours
Senior I		
MECH-322	Fluid Mechanics	4
MECH-330 & MECH-331	Dynamic Systems with Vibrations and Dynamic Sys w Vibrations Lab	4
MECH-427	Energy and the Environment	4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**16**
Senior II		
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
MECH-420	Heat Transfer	4
MECH-430 & MECH-431	Dynamic Systems with Controls and Dynamic Systems with Controls Lab	4
MECH-428	Bio and Renewable Energy	4

MECH-493	Senior Design 1	4
	Credit Hours	**20**
Senior III		
MECH-426	Fuel Cell Science and Engineering	4
MECH-445	Hybrid Electric Vehicle Propulsion	4
MECH-495	Senior Design Project	4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**16**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [1]	4
	Credit Hours	**4**
	Total Credit Hours	**56**

(Minimum) Total Credits Required for Program: 161

[1] Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Automotive Engineering Design Concentration

Freshman I through Junior II Rep. Program Credit Total: **105**

Course	Title	Credit Hours
Senior I		
MECH-322	Fluid Mechanics	4
MECH-330 & MECH-331	Dynamic Systems with Vibrations and Dynamic Sys w Vibrations Lab	4
Advanced Humanities or Social Science Elective		4
Automotive Concentration Electives [1,2]		8
	Credit Hours	**20**
Senior II		
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
MECH-420	Heat Transfer	4
MECH-430 & MECH-431	Dynamic Systems with Controls and Dynamic Systems with Controls Lab	4
MECH-493	Senior Design 1	4
	Credit Hours	**16**
Senior III		
MECH-448	Vehicle Design Project	4
Advanced Humanities or Social Science Elective		4
Automotive Concentration Elective		4
Automotive Concentration Elective		4
	Credit Hours	**16**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [3]	4
	Credit Hours	**4**
	Total Credit Hours	**56**

(Minimum) Total Credits Required for Program: 161

[1] Elective courses may vary in lecture and/or laboratory credits and terms from those shown.

[2] Students select a Concentration related elective or Concentration related ME elective with approval of their ME Concentration Advisor.

[3] Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Bioengineering Applications Concentration

Freshman I through Junior I Representative Program Credit Total: **85**

Course	Title	Credit Hours
Junior II		
MECH-300	Computer Aided Engineering	4
MECH-310	Dynamics	4
MECH-320	Thermodynamics	4
MECH-350	Introduction to Bioengineering Applications	4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**20**
Senior I		
MATH-258	Probability and Statistics	4
MECH-322	Fluid Mechanics	4
MECH-330 & MECH-331	Dynamic Systems with Vibrations and Dynamic Sys w Vibrations Lab	4
Advanced Humanities or Social Science Elective		4
Bioengineering Concentration Related Elective [1,2]		4
	Credit Hours	**20**
Senior II		
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
MECH-420	Heat Transfer	4
MECH-430 & MECH-431	Dynamic Systems with Controls and Dynamic Systems with Controls Lab	4
MECH-493	Senior Design 1	4
	Credit Hours	**16**
Senior III		
MECH-495	Senior Design Project	4
Advanced Humanities or Social Science Elective		4
Bioengineering Concentration Related Elective [1,2]		4
Bioengineering Concentration Related Elective		4
	Credit Hours	**16**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [3]	4
	Credit Hours	**4**
	Total Credit Hours	**76**

(Minimum) Total Credits Required for Program: 161

[1] Elective courses may vary in lecture and/or laboratory credits and terms from those shown.

[2] Students select a Concentration related elective or Concentration related ME elective with approval of their ME Concentration Advisor.
[3] Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Machine Design & Advanced Materials Concentration

Freshman I through Junior II Representative Program Credit Total: **105**

Course	Title	Credit Hours
Senior I		
MECH-322	Fluid Mechanics	4
MECH-330 & MECH-331	Dynamic Systems with Vibrations and Dynamic Sys w Vibrations Lab	4
MECH-416	Introduction to Finite Element Analysis with Structural Applications	4
MECH-482	Mechanics and Design Simulation of Fiber-Reinforced Composite Materials	4
Advanced Humanities or Social Science Elective		4
	Credit Hours	**20**
Senior II		
LA-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
MECH-420	Heat Transfer	4
MECH-430 & MECH-431	Dynamic Systems with Controls and Dynamic Systems with Controls Lab	4
MECH-493	Senior Design 1	4
	Credit Hours	**16**
Senior III		
MECH-495	Senior Design Project	4
Advanced Humanities or Social Science Elective		4
Machine Design Concentration Electives [1,2]		8
	Credit Hours	**16**
Any Term		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion [3]	4
	Credit Hours	**4**
	Total Credit Hours	**56**

(Minimum) Total Credits Required for Program: 161

[1] Elective courses may vary in lecture and/or laboratory credits and terms from those shown.
[2] Students select a Concentration related elective or Concentration related ME elective with approval of their ME Concentration Advisor.
[3] Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

SCHOOL OF MANAGEMENT

The School of Management is home to the Department of Business. The programs offered by the School develop business leaders through ***an interdisciplinary*** management education. The School of Management offers an undergraduate degree in Management and a variety of Master's programs including Master of Science in Operations Management, Master of Science in Engineering Management, Master of Science in Supply Chain Management, Master of Business Administration (MBA) and Technical Master of Business Administration (Tech MBA).

The Vision of School of Management

Kettering University School of Management aims to be a premier technology-oriented business school that connects transformational experiences with rigorous management education to produce innovation-driven managers who are known for their leadership.

The Mission of School of Management

Kettering University School of Management provides industry-relevant management education integrating emerging technologies, innovation, and entrepreneurship for the solution of critical business and social problems.

The Statement of Social & Community Responsibility

The Kettering University School of Management prepares technologically sophisticated leaders that foster economic and societal progress in a globally responsible and sustainable way.

ACADEMIC PROGRAMS

UNDERGRADUATE MAJOR

Bachelor of Science in Management (BSM) (p. 32)

The Bachelor of Science in Management is a unique combination of management and business-related courses with a substantial amount of technical and quantitative analysis. The objective of this program is to prepare graduates for leadership roles in business organizations through a rigorous common core, a foundation in systems management, and customized concentrations built around student interests. Integration of project-based instruction and cooperative industrial experience prepares students for the management challenges of increasingly complex business environments.

Explore concentrations in Business Analytics, Innovation and Entrepreneurship, Supply Chain & Logistics Management, Sustainability Management, and Technology Leadership.

UNDERGRADUATE MINORS

The School of Management also offers two minors available to students not majoring in Management: the Business Minor and the Innovation and Entrepreneurship Minor.

BUSINESS (p. 34)
The Business Minor provides students not majoring in Business with a strong base in the key functional areas of Management. It also fulfills prerequisites for the Master of Business Administration (MBA), TECH MBA, Master of Science in Engineering Management, Master of Science in Operations Management and Master of Science in Supply Chain Management programs offered at Kettering University. In many cases, courses in the business minor will serve prerequisite needs for MBA programs at other institutions.

INNOVATION AND ENTREPRENEURSHIP (p. 35)
The Innovation and Entrepreneurship Minor is designed for students interested in starting their own business or leading the creation of new ideas within an existing business. The program empowers students to think creatively, to seek opportunities and solve problems, to empathize with others, to take risks, to accept failure as part of the growth process, and to help take a passion or idea and turn it into a viable business.

BS/MASTERS PATHWAY

Undergraduate students also have an opportunity to get their bachelor's and master's degrees in five years with the BS-MASTERS Pathway.

MINORS

A minor is an area of concentrated study, outside of the major area of study. A minor requires a minimum of four classes (16 credits) in a directed area of study. Minors may require coursework in a student's degree program beyond the minimum of 141-161 credits required for completion of the major. Minors are not required for graduation though a student may elect to pursue a minor in an area of additional interest. Minors appear on a student's transcript at student declaration, and requirements must be completed at the time of graduation.

A student wishing to declare a minor should consult the head of the department that houses the minor, or a faculty advisor in that department. The student is then responsible for submitting a request to the Registrar's Office for processing.

Minors

Acoustics Minor

School of Foundational Studies

Total Required Credits: 16

Code	Title	Credit Hours
PHYS-302	Vibration, Sound and Light	4
PHYS-388	Acoustics in the Human Environment	4
EP-485	Acoustic Testing and Modeling	4
Choose one from:		4
EE-336	Continuous-Time Signals and Systems	
EE-338	Discrete-Time Signals and Systems	
MECH-330 & MECH-331	Dynamic Systems with Vibrations and Dynamic Sys w Vibrations Lab	
Total Credit Hours		**16**

Applied and Computational Mathematics Minor

School of Foundational Studies

Total Required Credits: 32

Code	Title	Credit Hours
MATH-101	Calculus I	4
MATH-102	Calculus II	4
MATH-203	Multivariate Calculus	4
MATH-204	Differential Equations & Laplace Transforms	4
MATH-305	Numerical Methods and Matrices	4
Select two mathematics courses from the following list:		8
MATH-258	Probability and Statistics	
MATH-308	Abstract Algebra	
MATH-313	Boundary Value Problems	
MATH-321	Real Analysis I	
MATH-327	Probability & Stochastic Modeling	
MATH-416	Vector Analysis	
MATH-418	Systems of Linear Differential Equations and Control	
Any one additional mathematics course must be selected.		4
Total Credit Hours		**32**

Artificial Intelligence

Computer Science Department

Total Required Credits: 24

Code	Title	Credit Hours
CS-101	Computing & Algorithms I	4
CS-102	Computing & Algorithms II	4
CS-481	Artificial Intelligence	4
CS-482	Machine Learning	4
Select Two of the following		8
CS-441	Foundations of Data Science	
CS-465	Information Retrieval and Data Mining	
CS-483	Algorithms for Deep Learning	
CE-442	Mobile Robotics	
CE-452	Artificial Intelligence for Autonomous Driving	
CE-454	Computer Vision for Autonomous Driving	
IME-408	Industrial Robotics	
IME-412	Applied Control Systems Design	
MGMT-423	Data Analytics	
MGMT-424	Data Visualization	
MGMT-425	Digital Strategy and Competitive Advantage	

For more information on the Artificial Intelligence Minor contact the Computer Science Department at computerscience@kettering.edu.

Business Minor

School of Management

The School of Management offers the Business Minor and the Innovation and Entrepreneurship Minor. In the contemporary technology driven economy, every career path requires business acumen to understand and apply the technology, terminology and techniques of today's best business practices. The Business Minor is the most popular minor at Kettering University. When combined with a major outside of business, the Business Minor creates added value by providing students with an understanding of business basics, prerequisites for further study of business, and exposure to management fundamentals. A minor in business supports success in leadership and managerial roles and prepares anyone interested in running her or his own business or a non-profit organization.

Total Required Credits: 32

Code	Title	Credit Hours
ECON-201	Economic Principles	4
Economics Elective 300 or higher		4
BUSN-103	Introduction to Marketing	4
MGMT-104	Management Concepts	4
BUSN-221	Financial Accounting	4
BUSN-331	Financial Management	4
Select one of the following:		4
MATH-258	Probability and Statistics	
MATH-327	Probability & Stochastic Modeling	
MATH-330	Biostatistics	
Select one of the following:		4
MGMT-419	Project Management	
MGMT-465	Strategic Management	
MGMT-479	Leadership	
Total Credit Hours		**32**

For more information on the Business Minor contact the School of Management at 810-762-9630, som@kettering.edu.

Computer Engineering Minor

Electrical and Computer Engineering Department

Total Required Credits: 36

Code	Title	Credit Hours
CE-210	Intro to Digital Systems Design	4
CE-320	Intro to Microcomputers	4
CS-101	Computing & Algorithms I	4
CS-102	Computing & Algorithms II	4
EE-210	Engineering Circuit Analysis 1	4
EE-320	Introduction to Microelectronic Devices and Circuits	4
CE-412	Digital Systems Design	4
or CE-422	Computer Architecture and Organization	
CE-420	Microcomputer Systems	4
or CE-426	Real-Time Embedded Systems	
CE-480	Computer Networks	4
or CS-451	Operating Systems	
Total Credit Hours		**36**

For more information on the Computer Engineering Minor contact the Electrical and Computer Engineering Department at ece@kettering.edu.

Computer Gaming Minor

Computer Science Department

Total Required Credits: 20

Code	Title	Credit Hours
CS-101	Computing & Algorithms I	4
CS-102	Computing & Algorithms II	4
CS-320	Computer Graphics	4
CS-385	Elements of Game Design	4
CS-485	Advanced Game Development	4
Total Credit Hours		**20**

For more information on the Computer Gaming Minor contact the Computer Science Department at computerscience@kettering.edu.

Computer Science Minor

Computer Science Department

Total Required Credits: 24

Code	Title	Credit Hours
CS-101	Computing & Algorithms I	4
CS-102	Computing & Algorithms II	4
CS-203	Computing & Algorithms III	4
CS-211	Discrete Mathematics	4
Select two Computer Science courses numbered 300 or above		8
Total Credit Hours		**24**

For more information on the Computer Science Minor contact the Computer Science Department at computerscience@kettering.edu.

Cybersecurity Minor

Computer Science Department

Total Required Credits: 32

Code	Title	Credit Hours
CS-101	Computing & Algorithms I	4
CS-102	Computing & Algorithms II	4
CS-355	Introduction to Cybersecurity	4
CS-381	Ethical Hacking	4

CS-415	Cryptography	4
CS-457	Wireless and Mobile Security	4
CS-458	Digital Forensics	4
CE-480	Computer Networks	4
Total Credit Hours		**32**

For more information on the Cybersecurity Minor contact the Computer Science Department at computerscience@kettering.edu.

Economics Minor

School of Foundational Studies

Total Required Credits: 16

Code	Title	Credit Hours
ECON-201	Economic Principles	4
ECON-342	Intermediate Microeconomics: Managerial Economics	4
ECON-344	Intermediate Macroeconomics: Economic Growth and Fluctuation	4
Select one of the following:		4
ECON-348	History of Economic Thought	
ECON-352	International Economics	
ECON-354	Money and Banking	
ECON-391	Economics Special Topics	
Total Credit Hours		**16**

Electrical Engineering Minor

Electrical and Computer Engineering Department

Total Required Credits: 32

Code	Title	Credit Hours
ECE-101	MATLAB and C Programming	4
or CS-101	Computing & Algorithms I	
CE-210	Intro to Digital Systems Design	4
EE-210	Engineering Circuit Analysis 1	4
EE-310	Engineering Circuit Analysis II	4
EE-320	Introduction to Microelectronic Devices and Circuits	4
EE-336	Continuous-Time Signals and Systems	4
or EE-338	Discrete-Time Signals and Systems	
Select two additional courses that have an EE prefix or a CE prefix.		8

For more information on the Electrical Engineering Minor, contact the Electrical and Computer Engineering Department at ece@kettering.edu.

Innovation and Entrepreneurship Minor

School of Management

The School of Management offers the Innovation and Entrepreneurship Minor and the Business Minor. The Innovation and Entrepreneurship Minor provides students with the background to manage the creation of new products, processes or methods within existing organizations, as well as foundational exposure to commercialize creative and innovative ideas into new business ventures. Engineers and scientists are essentially inventors of the future and engineering/science and innovation go hand in hand. Regardless of whether one initiates a new venture or not, the Innovation & Entrepreneurship Minor students are better equipped to conceptualize, objectify and enact opportunities for themselves and their employers, to bring creative and innovative thinking to the problems they face and to mobilize the resources they need to implement new and better solutions.

Total Required Credits: 28

Code	Title	Credit Hours
ECON-201	Economic Principles	4
Economics Elective 300 or higher		4
BUSN-303	New Venture Creation: Entrepreneurship	4
BUSN-304	Innovation Development	4
BUSN-321	Entrepreneurial Thinking	4
BUSN-402	Business Law	4
Select one of the following:		4
MATH-258	Probability and Statistics	
MATH-327	Probability & Stochastic Modeling	
MATH-330	Biostatistics	
Total Credit Hours		**28**

For more information on the Innovation and Entrepreneurship Minor contact the School of Management at som@kettering.edu.

Manufacturing Minor

Total Required Credits: 28

Code	Title	Credit Hours
IME-100	Interdisciplinary Design and Manufacturing	4
IME-200	Introduction to Industrial Engineering	4
IME-300	Manufacturing Processes	4
Select One of the following		4
CHEM-223	Introduction to Polymer Science	
EP-342	Introduction to Materials Science and Engineering	
MECH-307	Materials Engineering	
Select One of the following		4
IME-471	Quality Control	
IME-473	Design of Experiments	
IME-476	Lean Six Sigma	

Select Two of the following		8
EE-325	Principles of Microelectronics Processing	
IME-403	Computer Numerical Control Machining	
IME-408	Industrial Robotics	
IME-412	Applied Control Systems Design	
IME-414	Design for Manufacturing and Assembly	
IME-416	Additive Manufacturing	
MECH-416	Introduction to Finite Element Analysis with Structural Applications	
MECH-482	Mechanics and Design Simulation of Fiber-Reinforced Composite Materials	

Physics Minor

School of Foundational Studies

Total Required Credits: 16

Code	Title	Credit Hours
PHYS-302	Vibration, Sound and Light	4
PHYS-366	Quantum Physics	4
Select two of the following:		8
EP-446	Solid State Physics	
PHYS-412	Theoretical Mechanics	
PHYS-452	Thermodynamics and Statistical Physics	
PHYS-462	Quantum Mechanics	
Total Credit Hours		**16**

Statistics Minor

School of Foundational Studies

Total Required Credits: 32

Code	Title	Credit Hours
MATH-101	Calculus I	4
MATH-102	Calculus II	4
MATH-203	Multivariate Calculus	4
MATH-258	Probability and Statistics	4
MATH-327	Probability & Stochastic Modeling	4
MATH-330	Biostatistics	4
Two courses must be selected from the following list:		8
IME-332	Engineering Statistics	
IME-422	Simulation	
IME-471	Quality Control	
IME-473	Design of Experiments	
IME-476	Lean Six Sigma	
MATH-427	Statistical Inference & Modeling	
MATH-428	Sampling Theory	
Total Credit Hours		**32**

Sustainability Minor

Total Required Credits: 16

Code	Title	Credit Hours
Select one of the following		4
BIOL-143	Biology in Modern Society	
BIOL-311	Ecology	
Special Topics in Chemistry		
CHME-460	Sustainable Engineering Design: Energy and Environment	
CHME-491	Chemical Eng. Special Topics (*)	
EE-421	Energy Storage Systems with EV Applications	
MECH-426	Fuel Cell Science and Engineering	
MECH-427	Energy and the Environment	
MECH-428	Bio and Renewable Energy	
MECH-445	Hybrid Electric Vehicle Propulsion	
Select one of the following		4
HIST-329	Science, Technology, and the Modern World	
HUMN-380	Anticipating Futures: Technology, Nature, Society	
LIT-320	Literature & Environmental Justice	
LIT-391	Literature Special Topics (*)	
PHIL-374	Environmental Philosophy	
PHIL-391	Philosophy Special Topics (*)	
SSCI-310	The Flint Water Crisis	
SSCI-314	Technology and Sustainable Development	
Select two additional courses from above		8
*These courses can cover a variety of topics, depending on the term. Please check with Dr. Susan Farhat (sfarhat@kettering.edu) to ensure the topics for this course align with the minor.		

Pre-Med Minor

School of Foundational Studies

Total Required Credits: 37

Code	Title	Credit Hours
BIOL-141	General Biology	3
BIOL-142	General Biology Lab	1
BIOL-241	Human Biology	3
BIOL-242	Human Biology Lab	1
CHEM-135	Principles of Chemistry	3
or CHEM-137	General Chemistry I	
CHEM-136	Principles of Chemistry Lab	1
CHEM-237	General Chemistry II	3
CHEM-238	General Chemistry II Lab	1
CHEM-345	Organic Chemistry I	4
CHEM-346	Organic Chemistry I Lab	2
CHEM-347	Organic Chemistry II	4
CHEM-351	Biochemistry I	4
CHEM-352	Biochemistry Lab	3
MEDI-100	Integrated Medical Terminology and Practice	4
Total Credit Hours		**37**

Supplementing traditional degree requirements at Kettering with the Pre-Med minor prepares students for a career in the health sciences. This minor is ideal for students who are considering going into further professional education in medicine or healthcare-related programs. Completing this minor ensures students get a well-rounded science education and forms a foundation for a range of training in allied health fields.

- Other requirements for most medical schools, such as one year of college math, physics, statistics, and courses in liberal studies, are already included within most degree programs at Kettering.
- While most medical schools do not usually require other courses as prerequisite courses, we also recommend taking other specific courses to help prepare students who plan on taking the Medical College Admissions Test (MCAT). These include Anatomy & Physiology (BIOL-341), and a Psychology course (PSYC-350).

To explore how you might incorporate the pre-med minor into your degree curriculum, see the Academic Success Center. Students interested in Pre-Med should also consider participating in the Pre-Med Club.

ADMISSIONS

Kettering University's Office of Admissions evaluates student credentials to determine academic qualifications for all undergraduate degree programs. Applications for admission to Kettering University are evaluated holistically, emphasizing applicants' overall academic records, especially grades in core academic courses like science and math. The admissions committee reviews the applicant's high school grade record, course selection for college preparation, class standing or ranking (if available), and optionally submitted ACT or SAT scores. Additionally, recommendations from high school guidance counselors, teachers, administrators, and other relevant sources are considered. Kettering University seeks to admit students who demonstrate intellectual aptitude and the drive to excel at Kettering University. Kettering does not discriminate on the basis of race, color, national origin, age, marital status, sex, sexual orientation including gender identity or expression, disability, religion, height, weight, genetic information, or veteran status.

Scholastic Preparation

Applicants must be on track to complete a high school diploma or recognized equivalency. Students who have taken college courses before graduation from high school are still considered first-year applicants, including those in early or middle college programs. Strong consideration for admission will be given to students who have completed the following courses prior to enrollment:

English	Six semesters required (eight semesters recommended)
Mathematics	Four Semesters - Algebra
	Two semesters - Geometry
	One semester - Trigonometry, often included in Algebra II and/or Pre-calculus
Science	Four semesters - science with lab including two semesters of either Chemistry or Physics. Both are strongly recommended.

We encourage all applicants to complete English, science, and math courses beyond these minimum requirements. Training and experience in computer aided design (CAD) and computer science may also be considered.

Beyond these minimum requirements, Kettering does not have a fixed formula for determining admission. Admission to Kettering University is competitive and a strong record of academic achievement is expected.

First-Year Student Applications

Students interested in admission to Kettering University must apply using either the Common Application or the Kettering Application.

Students are encouraged to apply in the fall of their senior year. Kettering subscribes to the following application priority dates:

	Early Action	Regular Admission Priority	Rolling Admissions
Application Deadline	November 15	January 15	Ongoing until spaces are filled
Admissions Decision	December 15	February 15	Within four weeks after your application is received

A completed application, unofficial transcripts, standardized test results (optional)*, and supplemental materials, including personal essays, must all be received for evaluation to occur. All credentials submitted to the Office of Admissions to become part of the applicant file at Kettering University and cannot be returned to the applicant nor forwarded to any other institution.

If you have any questions regarding the application process, please call the Office of Admissions at 810-762-7865.

*Test-Optional Policy

Kettering University is test-optional for all students. Students may submit SAT/ACT score(s) if they feel it will benefit their standing in the admissions review process. Students who choose not to submit standardized testing scores will not be negatively impacted during the review process.

Official Transcripts

Matriculation into Kettering is contingent upon satisfactory performance in and completion of senior-level courses in which the student is enrolled. Final high school and college/university transcripts must be submitted to the Office of Admissions. Failure to do so will impact a student's ability to register for classes.

Students must have official transcripts and supporting information submitted directly to Kettering University from their high school guidance offices. Transcripts handled by students are considered unofficial and will not be evaluated. Transcripts must account for all high schools attended and, for dual-enrolled students, all colleges/universities attended (including all for-credit online classes).

Homeschool Student Applicants

Kettering University welcomes applications from homeschooled students. Students must submit the same application materials and meet the same admission requirements as all other high school students including a completed online application (including essay), standardized test scores (optional), and official transcripts developed by the home school association or by primary teachers.

All transcripts should include: course names, credits, in progress/final grades for all grade 9-12 courses, graduation date, and a signature affirming that the transcript is the official record of academic studies. If any high school credit was earned in a formal high school or college setting, the applicant must also supply an official transcript from that respective school. Courses taken online or through correspondence programs should be similarly documented. For evaluation purposes, we encourage especially clear documentation and explanation of all English, math, and science courses. The Office of Admissions will contact the student's primary educator if additional information is needed.

Please note that all materials sent as part of the application become the property of Kettering University and will not be returned to the student. Final transcripts showing a high school graduation date and/or final college transcripts must be submitted by all incoming students. Failure to do so will impact a student's ability to register for classes.

International Student Applicants

Students who reside outside of the United States and non-U.S. Citizens living in the United States are welcome to apply for admission to Kettering University. Admission decisions will be based on academic achievement in secondary school and/or university studies.

Transcripts/educational certificates and records with English translations must be sent directly from the applicant's school(s) to Kettering University. Additional items may be requested to complete the admission process, such as a secondary school/university grading scale or a professional credential evaluation. In the case of a professional credential evaluation, the evaluating body must be a member of the National Association of Credential Evaluation Services (NACES). Costs of credential evaluations and translations are the responsibility of the applicant. Before matriculating, all international students must provide official and final transcripts including proof of diploma/degree from all secondary education institutions/universities previously attended. Applicants are normally required to provide transcripts reflecting a grade 9-12 college preparatory program (possibly including a grade 13 option). However, at Kettering University's discretion, international applicants may be exempted from the requirement.

Students from non-English language speaking countries may be conditionally admitted based on academic merit with the understanding that English proficiency standards must be met before full matriculation into a degree-seeking program. To demonstrate English-language proficiency, students should submit at least one of the following test results: SAT, ACT, Test of English as a Foreign Language (TOEFL iBT or TOEFL Essentials), International English Language Testing System (IELTS), or Duolingo. Test requirements may be waived if a student has attended at least their last two consecutive academic years of high school where English is the language of instruction (documentation may be requested). Students completing their secondary education in an IB Diploma, Cambridge, or Sussex program may also be waived from English-proficiency testing. International transfer students may have testing waived if a student has attended an accredited U.S. college or university for one calendar year or two consecutive academic semesters with a minimum 3.0 grade point average (24 credit hours minimum). Students may also demonstrate competency by completing an ESL program offered by an approved ELS center. Evidence of English-language proficiency may be deemed invalid two years after the last relevant test date or date of enrollment.

Professionals in industry with significant work experience in a primarily English-speaking country, who are graduates of high school or college outside of the United States or without proof of English-language proficiency (above), are strongly encouraged to submit scores from an English-language proficiency exam.

Applicants may be required to participate in an additional spoken interview to assess English-language proficiency. Kettering University reserves this right to interview applicants regardless of any/all evidence of English-language proficiency submitted.

Immigration Information

Before matriculating, all international students who intend on attending Kettering University are required to schedule an immigration advising session appointment with the Admissions Immigration Designated School Official.

Applicants requiring an F-1 visa must also provide proof of Financial Support for on-campus programs. Before Kettering University can issue a Certificate of Visa Eligibility (Form I-20), international student applicants must document their ability to meet all educational expenses* for the first year of study:

- Completed Kettering University *Undergraduate Student* Affidavit of Financial Support.
- Documentation including statement(s) from legitimate financial institution(s) reflecting the minimum dollar amount detailed in the Affidavit of Financial Support. Institutional support offered by Kettering University does count toward the financial amount required.
- Copy of Passport.

*Medical insurance, including repatriation and evacuation coverage, is required for all international students and must be purchased through Kettering University.

Admitted international students meeting the above requirements will receive an I-20 form, which must be presented when applying for an F-1 Student Visa and again at their port of entry into the United States. Applicants enrolled at another U.S. institution with an F-1 Student Visa must complete Kettering's Transfer-In form and be released from the Student & Exchange Visitor Program (SEVIS) by their current institution before Kettering University can issue a new I-20 form.

Before matriculating, all international students must also provide official final transcripts, including proof of diploma/degree from secondary education institutions/universities previously attended.

Co-op Employment of International Students

Undergraduate degree-seeking international students are required to participate in Kettering's Cooperative and Experiential Education program. Participation in the Kettering Co-op program is a mandatory graduation requirement and is included in a student's F-1 Student Visa parameters; however, students must first complete two academic terms before co-op eligibility begins.

All students are responsible for work-term living expenses, transportation, and personal expenses.

Transfer Student Applicants

Kettering University is transfer-friendly and encourages students with prior college experience to apply for admission. Students who have taken any college courses after their high school graduation date are considered transfer students. Students completing a 13th year through Early or Middle College programs will still apply as first-year students. Kettering is an MTA (Michigan Transfer Agreement) receiving university, with a few specific recommendations.

Transfer applicants must have official transcripts sent directly to Kettering from all colleges/universities attended. Additional information, such as high school transcripts, may also be requested from students who have completed fewer than 24 credit hours. A list of courses in progress and catalog entry(s) with course descriptions from each college attended may also be requested.

Kettering University offers rolling admission, and transfer students may apply at any time during the year for entry in July, October, January, or April.

Scholastic Preparation

To be eligible for admission to Kettering University, transfer students must complete the following courses before enrollment (some of these requirements may have been completed at the high school level). College-

level math and laboratory science coursework will be strongly considered when evaluating transfer applications, especially for majors in the College of Engineering and the College of Sciences and Liberal Arts.

English	Six semesters required (eight semesters recommended)
Mathematics	Four semesters - Algebra
	Two semesters - Geometry
	One semester - Trigonometry, often included in Algebra II and/or Pre-calculus
Science	Four semesters - science with lab including two semesters of either Chemistry or Physics. Both are strongly recommended.

Academic Requirements for Transfer Students

Possession of the minimum grade point average for consideration does not imply admissibility to the University. Beyond this minimum scholastic requirement, Kettering does not have a fixed formula for determining admission. However, a strong record of academic achievement is expected. Primary consideration is given to the applicant's overall grade point average and number of credit hours taken. Secondary consideration is given to the student's employment history, extracurricular activities, honors, and other evidence of ability, achievement, and motivation.

A typical transfer student will have pursued 12-16 credit hours per semester of undergraduate coursework comparable to that of a Kettering University student. Candidates who have not pursued full-time collegiate study and/or have followed a program that does not include mathematics and science will be evaluated individually on their college and high school records (submitting college entrance exam scores is optional).

Prospective transfer students should maintain an overall grade point average of at least a "B". Applicants with intended majors within the College of Engineering and the College of Sciences and Liberal Arts should also have strong math and science grades – again of at least a "B".

Transfer Credit Evaluation

Courses submitted for transfer credit should be comparable in content and difficulty to those offered at Kettering University. To complete a preliminary credit self-audit, use the Degree Works Tool. Students must earn a grade of at least a "C" or equivalent in an individual class for that class to be considered for transfer credit. Applicants must provide official transcripts and may be required to provide the Registrar's Office with a college course catalog, course syllabi, or additional information for evaluation purposes. Transfer applicants who have completed Advanced Placement (AP) or International Baccalaureate (IB) courses may also need to have official AP/IB scores sent to the university.

Admitted students will be contacted with the results of an official credit evaluation after submitting a $300 enrollment deposit. However, a self-assessment using the Degree Works Tool will provide dependable results with few exceptions.

Suggested Courses

Transfer coursework should include general education classes common to undergraduate degree programs and should reflect a strong background in math and science:

Code	Title	Credit Hours
CHEM-135 & CHEM-136	Principles of Chemistry and Principles of Chemistry Lab	4
COMM-101	Rhetoric & Writing (Composition & Speech)	4
ECON-201	Economic Principles (Micro and/or Macro)	4
MATH-101	Calculus I (Differential Calculus)	4
MATH-102	Calculus II (Integral Calculus)	4
PHYS-114 & PHYS-115	Newtonian Mechanics and Newtonian Mechanics Laboratory (Calculus-based)	4
PHYS-224 & PHYS-225	Electricity and Magnetism and Electricity and Magnetism Laboratory	4
History, Literature, Philosophy, etc. (300+ level)		4

Transfer of Experiential and Cooperative Education Work Experience

Transfer students entering Kettering with less than Junior 1 (JR1) standing who have participated in another comparable college-level cooperative and experiential education program, or those who have significant work experience related to their Kettering University degree program, may be eligible to transfer these experiences towards their Kettering Co-op degree requirements. Students should contact the Cooperative and Experiential Education Office at 810-762-9846 to determine the documentation necessary to transfer a maximum of two work terms (only applicable toward freshman-sophomore requirements).

Military Veterans and Families

Kettering University is a member of the Post-9/11 G.I. Bill (Chapter 33) and Yellow Ribbon programs. Those on active duty, released from active duty, active reserve, inactive reserve, and dependents of military service members may apply for admission as first-year, transfer, or graduate students. Military veterans should have their Joint Services Transcript (JST) submitted as part of their application for admission. To utilize the Post-9/11 G.I. Bill or Yellow Ribbon program, military service members must speak with their respective Educational Service Officers or counselors and apply for tuition benefits through the Veterans Affairs.

Additional Requirements for Admitted Students

Enrollment Deposit

All admitted students must submit a $300 enrollment deposit to confirm enrollment to Kettering University and reserve their seats in the class. The deposit will be credited towards tuition, room, and board. The undergraduate enrollment deposit is fully refundable until May 1 of each year's traditional application cycle.

Math Placement Examination

Kettering University uses ALEKS PPL for math placement in a student's first academic term. ALEKS is a dynamic tool that utilizes adaptive technology to assess and place students at the most appropriate level for their first math course. All students are required to complete ALEKS prior to their first term, and the University will use the highest placement score for their first math course. This score could be from ALEKS or math credits they bring in, such as credits from AP or IB courses, Dual

Enrollment, Early College, etc. Students who have received appropriate transfer credit, or Advanced Placement or International Baccalaureate credit, may be exempt from the exam, as we don't require all transfer students to complete ALEKS, depending on what they've completed before applying to Kettering. ALEKS only measures competency up to Calculus I. For more information about AP and IB credits, please see below. For questions about math placement, students should contact the Academic Success Center at academicsuccess@kettering.edu.

Health, Counseling, Accessibility Services & Health Insurance Information

Prior to enrollment, all students must complete a Health Inquiry Form. All medical information is confidential and cannot be released without the student's knowledge or written consent. The Kettering University Wellness Center uses this information to create a continuous record of student wellness care. All students must answer the TB screening questions and submit documentation if needed within the inquiry. Information on what to do about physical and/or mental health concerns, including disability accommodations, can be addressed directly with the Wellness Center staff via email at wellness@kettering.edu.

Kettering University requires all enrolled students to carry health insurance. International students are automatically enrolled in the Kettering Student Health Insurance Plan upon arrival on campus. Domestic students must annually provide proof of insurance online to waive out of Kettering's Student Health Insurance Plan. Contact the Wellness Center for updates on annual deadlines to submit health insurance information. Students who do not complete a waiver will be automatically enrolled. Students who fail to provide proof of health insurance through verification will remain enrolled in the Kettering Student Health Insurance Plan and be responsible for associated costs. The University will make no exceptions.

Kettering University does not require a medical examination before enrollment. However, some Kettering Co-op employers may require such an exam as a condition of employment or due to particular working conditions.

Cooperative and Experiential Education Employment Process

Accepted students are eligible to begin the Kettering Co-op employment search process in the spring of their senior year of high school or once they have been admitted as a transfer student. Students need to have a Kettering-approved resume and are encouraged to work with their assigned Co-op Managers. The Cooperative and Experiential Education Office may start forwarding the resumes of applicants to potential co-op employers several months before the start of classes. Careful attention is given to the student's objectives, needs, and preferences, as well as employer criteria. Transfer students are eligible to begin their Kettering Co-op employment search process any time after acceptance.

Companies may choose to interview applicants based on academic performance, employment history, extracurricular activities and honors. Factors influencing final selection include communication skills, leadership potential, a desire for a career in the industry, and the capacity to acquire the necessary academic and practical background for a future position of responsibility. Information concerning the interviewing process is available from the Cooperative and Experiential Education Office at 810-762-9846.

Housing Application

In recognition of the educational value of an on-campus living experience, the Kettering University Board of Trustees has officially adopted an on-campus residency and meal plan requirement. Students must complete housing applications before moving onto campus. All first-year students are required to live in Thompson Hall and have a full meal plan during their first two academic terms.

Students who transfer to Kettering University must reside in Thompson Hall and have a full meal plan for their first two academic terms at Kettering University unless they meet one or more of the following documented criteria: be 21 years of age or older prior to the last day of classes of the term; be married; have child(ren) in residence with legal custody or guardianship; have previously completed two terms in a residence hall (at a college/university). Documentation may be requested for verification. New incoming students meeting the above criteria and wishing to live off-campus should complete a Housing Release Request through the myhousing portal at least two weeks prior to the start of the student's first academic term.

International Baccalaureate Credit

Applicants seeking International Baccalaureate (IB) credit should have an official IB transcript sent directly to Kettering's Office of Undergraduate Admissions. Credit will be granted for passes at the "IB Standard Level (SL)" in Computer Science only. Credit will be issued for passes at the "IB Higher Level (HL)" according to the IBO table below.

IBO Exam	Required Score	Credits Granted	Kettering Course Number
Biology (Higher Level)	6, 7[1]	3 and 1	BIOL-241 & BIOL-242
Chemistry (Higher Level)	5, 6, 7	3 and 1	CHEM-135 & CHEM-136
Computer Science (Higher Level)	5, 6, 7	4	CS-297
Computer Science (Standard Level)	5, 6, 7	4	CS-297
Economics (Higher Level)	6, 7	4	ECON-201
English (Higher Level)[1]	6, 7	4	HUMN-297
Foreign Language - Any (Higher Level)[1]	6, 7	4	LANG-297
History (Higher Level)[1]	6, 7	4	HIST-297
Math: Applications and Interpretation (Higher Level)	5, 6, 7	4	MATH-101
Math: Analysis and Approaches (Higher Level)	5, 6, 7	4	MATH-101
Philosophy (Higher Level)[1]	5, 6, 7	4	PHIL-297
Physics (Higher Level)	6, 7[1]	3 and 1	PHYS-114 & PHYS-115

Social & Cultural Anthropology (Higher Level)[1]	6, 7	4	SSCI-297
Sociology (Higher Level)[1]	6,7	4	SSCI-297

[1] Course counts as a free elective in all degree programs. Seek department advisement for the curriculum requirement application. Kettering University awards credit for IB scores of 5, 6 or 7 for Physics and Biology when the full IB diploma has been earned.

Advanced Placement Credit

Applicants who have completed Advanced Placement (AP) courses are encouraged to take the College Board AP Examinations. The chart below indicates the scores needed to receive Kettering University credit. Students should have an official AP transcript sent to Kettering directly from the College Board AP Program. AP credits do not override prerequisite requirements.

Advanced Placement Exam	Required Score	Credits Granted	Kettering Course Number
African-American Studies	4,5	4	SSCI-297
Art History[1]	4, 5	4	HUMN-297
Art Studio 2-D Design[1]	4, 5	4	HUMN-297
Art Studio 3-D Design[1]	4, 5	4	HUMN-297
Biology[2]	4, 5	3 and 1	BIOL-141 & BIOL-142
Calculus AB	4, 5	4	MATH-101
Calculus AB Subgrade	4, 5	4	MATH-101
Calculus BC	4, 5	4 and 4	MATH-101 & MATH-102
Capstone	4,5	4	LA-197
Chemistry	4, 5	3 and 1	CHEM-135/136 or CHEM-137/136
Comparative Government and Politics[1]	4, 5	4	SSCI-297
Computer Science A	4, 5	4	CS-101
Computer Science Principles[1, 2]	4, 5	4	CS-297
English Language and Composition[1]	4, 5	4	HUMN-297
English Literature and Composition[1]	4, 5	4	HUMN-297
Environmental Science[2]	4, 5	4	BIOL-297
European History[1]	4, 5	4	SSCI-297
Foreign Language and Culture - Any[1]	4, 5	4	LANG-197
Foreign Literature and Culture - Any[1]	4,5	4	HUMN-197
Government and Politics[1]	4, 5	4	SSCI-297
Macroeconomics[3]	4, 5	4	ECON-201
Microeconomics[3]	4, 5	4	ECON-201
Music Theory[1]	4, 5	4	HUMN-297
Physics C, Part I-Mechanics	4, 5	3 and 1	PHYS-114 & PHYS-115
Physics C, Part II-Electricity & Magnetism	4, 5	3 and 1	PHYS-224 & PHYS-225
Psychology[1]	4, 5	4	PSYC-297
Research[1]	4, 5	4	LA-197
Seminar[1]	4, 5	4	LA-197
Statistics[2]	3, 4, 5	4	BUSN-271
U.S. History[1]	4, 5	4	HIST-297
World History[1]	4, 5	4	SSCI-297

[1] Course counts as a free elective in all degree programs.
[2] Seek department advisement for the curriculum requirement application.
[3] This AP course can count as ECON-297 (Free Elective) if student already has credit for ECON-201.

NOTE: The course numbers 297 shall be used to admit credit for AP courses that are not equivalent to existing Kettering courses.

Admission of Non-degree Seeking Students

Dual/Early Enrollment classes available at Kettering University

Kettering University offers exceptional high school students an opportunity to experience university academics at our nationally recognized university through the State of Michigan guidelines for early enrollment or dual enrollment programs. This program is available to any 11th or 12th-grade student who meets Kettering's registration requirements listed below. The student/parent is responsible for all costs associated with early enrollment at Kettering University. Through dual enrollment, the student's high school pays a portion or all of the tuition, and the student/parent/guardian is responsible for any additional costs not paid by the high school. State guidelines and the high school determine the course eligibility and the amount of tuition the high school is responsible for paying. No application fee is required. Two courses per term are allowed, and a maximum of 16 credit hours per academic year.

Dual/Early Enrollment Registration Requirements

The following must be submitted for course registration:

- High School transcript with 3.2 GPA
- Completed application

The Admissions Office approves registrations based on available space.

Questions about early/dual enrollment can be directed to the Office of Admissions at admissions@kettering.edu or 810-762-7865.

Financial Aid

Financial Aid Policies

Required Forms

- Free Application for Federal Student Aid (FAFSA)
- Other documentation required for federal verification as requested

Important Information

- To be considered for all available awards, students are encouraged to apply early.
- All required documents must be submitted to the Financial Aid Office in a timely manner to avoid any delays in the processing of financial aid applications. Once the necessary documents have been submitted and eligibility is confirmed, loan requests will be certified, and need-based grants will be credited to the student's account. Additionally, the Federal Work-Study program will be initiated for eligible students.
- Each academic year students are required to read through and accept the Terms and Conditions in their Student Banner Self Service in order for their Kettering University Merit Scholarship to be disbursed to their account for the appropriate terms.
- Students may be selected in a process called Verification and additional documents may be required. Failure to submit the documents required by the verification process within the given timeframe will result in the loss of eligibility for federal financial aid. Therefore, students should prioritize completing the verification process as soon as possible to avoid any unnecessary complications.
- Scholarships and grants are credited to student accounts according to the schedule on the financial aid offer letter. Loans are credited upon receipt of funds. Earnings from on-campus employment are paid on a bi-weekly basis.
- Students may contact the Financial Aid Office in Room 4-700 CC between the hours of 8:00 a.m. and 5:00 p.m. (Monday - Friday) for specific details regarding eligibility, application procedures, deadlines, and required documents.

In addition to cooperative education earnings, there are three basic types of financial assistance for students: gift aid, loans, and campus employment. While these are described below, the Kettering University website contains detailed information about these awards.

Gift Aid Sources

- **Federal Pell Grant** This grant is from the federal government and is awarded based on the student's Student Aid Index (SAI) as determined by the federal methodology needs analysis formula by completing the FAFSA.
- **Federal Supplemental Educational Opportunity Grant (SEOG)** This grant is from the federal government and may be awarded by the Kettering University Financial Aid Office to undergraduate students who demonstrate exceptional financial need.
- **Michigan Competitive Scholarship** This scholarship is awarded by the Michigan Department of Education to Michigan residents. Eligibility is based on academic requirements and financial need. Students must initially qualify for the scholarship before enrolling as college freshmen. The scholarship is renewable for a maximum of ten semesters, with renewal based on continued need and satisfactory academic progress. Recipients must file the Free Application for

Federal Student Aid (FAFSA) each year before the State of Michigan deadline of March 1.

- **Michigan Achievement Scholarship** Beginning with the 2023-24 year, students graduating from a Michigan high school in 2023 will be considered for the Michigan Achievement Scholarship, up to $4,000 per year if they attend a private college or university. Students will be eligible if their family demonstrates financial need when they complete the FAFSA. Those that will qualify for the scholarships must be from families where the expected family contribution is less than $30,000.
-

Endowed Scholarships *Some scholarships are open to a wide spectrum of students, while others have specialized criteria. Questions regarding eligibility, scholarship guidelines, and the application process and deadlines should be directed to the Financial Aid Office.*

Loan Sources

Federal Direct Subsidized/Unsubsidized Loans These are loans that are available to students through the government's loan program. The amount students are eligible to borrow is based on their grade level. These loans have a fixed interest rate and can be deferred while the student is enrolled at least half-time. An origination fee is deducted from the approved loan amount before disbursement. This fee is determined each year and is subject to change. Repayment on these loans begins six months after graduation or when the student ceases to be enrolled at least half-time. These loans have a 10-year repayment plan.

- **Federal Direct Subsidized Loan** This is a need-based loan for which students are not responsible for the interest while in school at least half-time.
- **Federal Direct Unsubsidized Loan** This is a non-need loan for which the student is fully responsible for paying the interest. Interest begins to accrue once the loan has disbursed.

Dependent Students	Maximum Subsidized Loan	Maximum Unsubsidized Loan	Total Loan Eligibility
Freshman	3,500	2,000	5,500
Sophomore	4,500	2,000	6,500
Junior/Senior	5,500	2,000	7,500

Students that do not qualify for the need-based Subsidized Loan are eligible to borrow the "Total Loan Eligibility" from the Unsubsidized Loan. The student's award letter will reflect the amount they are eligible to borrow.

- **Federal Direct PLUS Loan** A credit-based loan that is available to the parents of dependent students who have completed the FAFSA. The amount that a parent may borrow is based on the student's educational costs minus any other financial aid received. The interest rate is fixed; however, interest does begin to accrue once the loan has disbursed. A payment deferment is an option is available if it is requested by the parent. Otherwise, repayment begins 60 days after the final disbursement of the academic year. An origination fee is deducted from the approved loan before disbursement. This fee is determined each year and is subject to change.
  Note: If a parent is denied a PLUS Loan due to an adverse credit history, the dependent student can access an additional loan through the Federal Direct Unsubsidized Loan program listed above. The amounts are as follows:

Dependent Students with a PLUS Denial or Independent Students	Maximum Subsidized Loan	Maximum Unsubsidized Loan	Total Loan Eligibility
Freshman	3,500	6,000	9,500
Sophomore	4,500	6,000	10,500
Junior/Senior	5,500	7,000	12,500

- **Private Student Loan Programs** These programs are intended to provide students and their families an alternate source of loan funds to assist in meeting the cost of postsecondary education. These loans are credit-based and offered through third-party lenders to the student. Interest on a private loan will begin to accrue once the loan has disbursed. Repayment on most loans begins six months after graduation or when the student ceases to be enrolled at least half-time. Contact the Financial Aid Office for further details.

On-Campus Student Employment

Federal Work-Study (FWS) is a program that assists Kettering University in providing on-campus employment for students with demonstrated need.

Campus employment (Student Labor) is available on a limited basis to students without financial need who would like to earn money toward educational cost while attending school.

Satisfactory Academic Progress (SAP)

To maintain financial aid eligibility, you must make Satisfactory Academic Progress (SAP) toward obtaining a degree. Satisfactory Academic Progress will be monitored at the end of each academic term whether or not you have received financial aid. This policy applies to all federal, state, and university-funded grants, along with some private student loans.

Minimum standard requirements:

- **Qualitative Measure (Cumulative GPA):** Must maintain a cumulative grade point average (GPA) of at least 2.0 at the end of each academic term.
- **Quantitative Measure (Pace of progression to ensure completion within the maximum time frame):** Pace of progression is determined by dividing the cumulative number of credit hours successfully completed by the cumulative number of credit hours attempted, including transfer hours that have been accepted. Undergraduate students must maintain a pace of progression of 67% for all course work attempted, including transfer credits.
- **Credits Attempted** are defined as all classes for which a student received a passing grade ("D" or better), or an "F", "FN", "W", "WN" or "I".
- **Credits Completed** are defined as all classes for which a student receives a passing grade of "D" or better.
- **Audit Credits** do not count as credits attempted or completed.
- **Repeated Courses** count as credits attempted during each term the student is enrolled in the course; however, they will be counted only once as credits completed the first time a passing grade is received for the course.
- **Transfer Credits** count towards the quantitative measure.

- **Maximum Time Frame (to Complete a Degree):** The maximum allowable timeframe for receiving aid is equal to 150 percent of the length of your academic program. If you are a transfer student, your accepted transfer coursework will be counted in the maximum timeframe.

Financial Aid Warning

Students who fail to meet the minimum standards for Satisfactory Academic Progress at the end of the academic term will be placed on Financial Aid Warning. A student may continue to receive financial aid for one semester while on Financial Aid Warning. Your progress will be monitored at the end of each academic term. *If you enroll in back to back academic terms, please check with the Financial Aid Office prior to starting the second consecutive term.*

If at the end of the Financial Aid Warning period, the student is meeting the minimum requirements for Satisfactory Academic Progress, the Financial Aid Warning is lifted.

Students who fail to make Satisfactory Academic Progress after the Financial Aid Warning semester will be ineligible for financial aid. You may appeal this status. If your appeal is approved, your financial aid eligibility will be reinstated, and you will be placed on Financial Aid Probation for one term. If your appeal is denied, your financial aid will be suspended for the next academic term.

Financial Aid Probation

To be on Financial Aid Probation you would have to successfully appeal not making Satisfactory Academic Progress after a Financial Aid Warning term. Students may receive aid for one more academic term if an appeal is granted.

If at the end of the Financial Aid Probation period, the student is meeting the minimum requirements for Satisfactory Academic Progress, the Financial Aid Probation is lifted.

Students who fail to make Satisfactory Academic Progress after the Financial Aid Probation semester will be ineligible for financial aid and placed on Financial Aid Suspension, and you will not be eligible to receive aid for your next period of enrollment.

Financial Aid Suspension

If the Financial Aid Office determines that you have not met the minimum standard requirements to receive financial aid, and your appeal is denied, you will not be eligible to receive aid for your next period of enrollment.

Appeal

If extenuating circumstances exist which caused a student to fail to meet one of the above standards, a written appeal may be submitted. Examples of extenuating circumstances include, but are not limited to unexpected death or major hospitalization of an immediate family member, extended hospitalization or medical condition of the student, house fire victim, or victim of a violent crime. The appeal should address and document these extenuating circumstances **and** include:

- Why you failed to make Satisfactory Academic Progress
- What has changed that will allow you to make Satisfactory Academic Progress during your next academic term

The appeal form is available on the Financial Aid website. The appeal form must be turned into the Financial Aid Office within 30 days of the notification that you are not meeting Satisfactory Academic Progress. Appeals must include supporting documentation. Incomplete appeals or those missing adequate documentation are typically denied.

Those suspended due to attempting credits more than the 150% of the program are not eligible for appeal.

Withdrawing from Courses

Financial aid is based on the number of credits for which students are enrolled at the end of the refund period. Students who are not registered for full-time at that point will have their aid reduced accordingly. Students are encouraged to meet with a financial aid advisor before making withdrawal decisions.

Withdrawing from Kettering

For financial aid purposes there are two types of withdrawals: complete and unofficial.

- Complete: Official withdrawal from the university by the student.
- Unofficial: Federal financial aid regulations consider a student to be an unofficial withdrawal if the student receives all fail (F) grades or a combination of all fail (F) and withdraw (W) grades for the term.

Student Fails to Earn a Passing Grade in any Class

Never Attended: If a student receives a grade of an F due to not attending class, Federal Title IV aid will be adjusted for those classes never attended.

- Example: A student is in four classes which are all worth four credits. The student receives three A grades and one F grade. The instructor reported that the student never attended the class that received the F grade. Aid will be adjusted from 16 credits (full time) to 12 credits (three-quarter time).
- Example: A student is in four classes which are all worth four credits. The student receives all F or W grades (no passing grades). If attendance has not been achieved up through the 60% point of the semester, a calculation is done to determine the amount of the Title IV funds that the student has earned at the time of withdrawal.

Why do we monitor students receiving all 'F' grades?

The University is obligated by federal regulation to review aid recipients receiving all 'F' grades. The assumption behind the law is that a student receiving all 'F' grades walked away from the semester without properly withdrawing from the University. Schools must identify students with 'F' grades within 30 days from the date final grades are posted.

Withdrawing Prior to Completing 60% of Term

Unless a student completes 60% of the term in which federal aid was disbursed, the student will be required to return all or part of the financial aid disbursed in the term. This applies to students who have officially (including medical) or unofficially withdrawn.

Student Financial Aid Enrollment Requirements

Kettering University is a semester-based University with two semesters. Each semester consists of an academic term and a work term.

- July-December is a semester (includes summer and fall terms).
- January-June is a semester (includes winter and spring terms).

Student aid, by law, is paid in semesters. Therefore, students who participate in non-standard enrollment (for example, attending school for two terms July-December and then working January-June) may experience decreased financial aid eligibility.

- Enrollment patterns that will not affect aid eligibility for traditional A-section students include the first and second examples on the chart below.
- Enrollment patterns that will not affect aid eligibility for traditional B-section students include the third and fourth examples on the chart below.

In summary, enrollment patterns that create problems include two academic terms within one semester.

Acceptable Academic Enrollments to Receive Financial Aid

Summer	Fall	Winter	Spring	Enrollment Pattern
X		X		Traditional A
X			X	A/B
	X		X	Traditional B
	X	X		B/A

Note: Students may, according to special needs by their employer, follow other patterns of academic/co-op terms. Students wishing to work three consecutive work terms may do so but will be listed inactive (not a student) for one of the three terms. A student must demonstrate progress toward a degree by attending two academic terms within a given year. Students should send a written request to the Registrar if interested in pursuing this option.

Financial Suspension

Failure to meet financial obligations or agreements with Kettering University may result in financial suspension. Financial suspension (determined by the Business Office) includes suspension from portions of or all privileges to which active students are entitled. Two privileges include issuance of transcripts and processing of current, and future, course registrations.

Honors Program

Incoming freshmen with exceptional academic backgrounds will be considered (by invitation only) for the Honors Program prior to matriculation at Kettering University. The Honors Program provides additional opportunities and enhanced learning experiences beyond the normal Kettering curriculum. Students who graduate as an Honors Program student in good standing will have this designation placed on their official transcripts and diplomas. For additional information, please contact the Admissions Office at admissions@kettering.edu or 810-762-7865.

Program Requirements

- Be accepted to Kettering University, receive an Honors Program invitation from the Provost Office, and submit a Statement of Intent to admissions@kettering.edu
- Earn a minimum of 15 credits per term, with possible exceptions senior year
- Complete an enhanced learning experience in two courses each term
- Maintain a cumulative GPA of 3.5 (students may have a 3.0 at the end of their first year after matriculation but must maintain a 3.5 GPA thereafter)
- Complete a minimum of 161 credits (minimum of 141 credits in the Computer Science major)

Program Benefits

Honors Program Engagement

Honors Program students benefit from additional engagement with faculty members in the completion of enhanced learning experiences each academic term; in select classes designated specifically for Honors Program students; and with an especially talented and motivated peer group.

Research Placements

Students have the option to pursue an Undergraduate Research Assistant position with a faculty member, usually following freshman year. Once a mutually-agreeable arrangement is made with a faculty member, the student may work for up to eight hours a week (for one academic year maximum) during academic terms and be paid through the Office of the Provost.

Early Admission into the BS/Master Option

Honors Program students are accepted into the BS/Master Option if they choose to pursue that option. Program prerequisite requirements will apply. With proper advising, students can enroll in and complete a masters degree within a year of finishing their undergraduate coursework.

Honors Designation

Notice of honors designation appears on students' Kettering University transcripts and diplomas, and students will be recognized at Commencement.

UNDERGRADUATE TUITION AND FEES

Expenses

The current tuition, room, board and business related fees are listed below. The Student Accounts Office will send an email notification to your Kettering email when your tuition bill is ready to view via KU.ePay in Banner Self Service (approximately one month prior to the start of the term). All invoiced amounts are due by the beginning of each academic term and all financial aid arrangements must be made by the end of the first day of classes.

KU.ePay is the university's online billing and payment service, which provides our students the ability to view and pay their student account bill online, 24 hours/day, seven days a week. Students may authorize others to access their KU.ePay account and make payments on their behalf.

With KU.ePay, students and authorized users are able to:

- Review their student account activity.
- View and print billing statements.
- Make payment on their student account, including a single payment or sign up for a payment plan.
- View and print form 1098-T.

Payments may be made via an ACH transaction from a bank account or credit card. International payments may be made through KU.ePay, and will be processed as a bank wire. Please visit KU.ePay for more information. Payment in the form of a check, money order, or cashier's check may be sent directly to the Student Accounts Office.

A $300 late fee will be assessed to accounts which have not been paid in full by 4:00 p.m. fourth week Friday of each academic term. Financial aid is available for students with a demonstrated need; sources of aid are discussed in the Financial Aid (p. 43) section of this catalog.

When registered for courses, students acknowledge enrollment in the courses selected and authorize Kettering University to bill for any related tuition and fees. To avoid any penalties, payment is due no later than 4th week Friday of each academic term. A financial hold and a $300 late fee will be assessed on any account not paid in full which prohibits future course registration and/or cancellation.

Tuition

For purposes of determining financial aid, a full academic load at Kettering University is considered to be 15 credit hours.

Tuition Rates

Tuition for Students Enrolled on July 1, 2023 and After
Students who enrolled on or after July 1, 2023 are subject to tuition rates established on an annual basis. Tuition and fees are assessed at the rates in effect for the applicable academic year and may change from year to year.

Academic Year 2025–2026 Tuition Rates:
• Full-time enrollment (15–22 credit hours): $25,235
• Overload tuition (fewer than 15 or more than 22 credit hours): $1,688 per credit hour

The institution reserves the right to modify tuition, fees, and related charges as approved by the governing board.

Tuition for Students Enrolled Prior to July 1, 2023
Students who enrolled prior to July 1, 2023 are subject to a fixed full-time tuition structure. Full-time enrollment is defined as 15–22 credit hours per academic term.

The fixed full-time tuition rate is $22,190 and applies for ten (10) consecutive academic terms, provided the student remains in good academic standing.

Students enrolled in fewer than 15 credit hours or in excess of 22 credit hours during any academic term will be assessed an overload tuition rate of $1,480 per credit hour, based on the student's entering fixed-tuition rate.

The institution reserves the right to modify tuition, fees, and related charges as approved by the governing board.

Room and Board

Room Rate Entering Class 2025-26, per term	$3,000
Room Rate Returning Students 2024-25 and prior, per term	$2,400
Board Rate (meal plan), per term	$2,400

Business Related

Exchange Student Enrollment Fee, per term	$250
NSF ACH/Check Processing Fee	$25
Student ID Card Replacement Fee	$10
Student Health Insurance, per year[1]	$1,586
Late Payment Fee	$300
Enrollment Deposit[2]	$300

1 The University requires students to submit proof of health insurance each academic year, or to purchase Kettering's Student Health Insurance Plan.
2 Enrollment Deposit is non-refundable after May 1.

Refund Rates

Tuition, Room, and Board

The following refund rates apply to students who separate from Kettering University before the end of an academic term. These rates also apply to those taking individual courses when dropping classes reduces total credit hours to part-time status (fewer than 15 credit hours), or from overload to full-time status (15-22 credit hours).

First Week	100%
Second Week	75%
Third Week	50%

Fourth Week	25%
Fifth Week	0%

Refund rates are calculated through Sunday of each week.

Any questions related to the tuition and fees can be directed to the Student Accounts Office at 800-955-4464 ext. 9552 or studentaccounts@kettering.edu.

VA Education Benefits

Kettering University will permit any covered individual to attend or participate in the course of education during the period beginning on the date on which the individual provides to the educational institution a certificate of eligibility for entitlement to educational assistance under chapter 31 or 33 (a “certificate of eligibility” can also include a “Statement of Benefits” obtained from the Department of Veterans Affairs’ (VA) website – eBenefits, or a VAF 28-1905 form for chapter 31 authorization purposes) and ending on the earlier of the following dates:

1. The date on which payment from VA is made to the institution.

2. 90 days after the date the institution certified tuition and fees following the receipt of the certificate of eligibility.

Kettering University will not impose any penalty, including the assessment of late fees, the denial of access to classes, libraries, or other institutional facilities, or the requirement that a student borrow additional funds because of the student’s inability to meet their financial obligations to the institution due to the delayed disbursement of a payment to be provided under chapter 31 or 33.

STUDENT EXPERIENCE

New Student Orientation: Campus Orientation Meetings to Prepare Students for Academic and Social Success [COMPASS] and Camp COMPASS

COMPASS, our new student orientation program, provides new students with information and social opportunities that will facilitate a smooth transition to Kettering University. Carried out over four days immediately preceding the beginning of new students' first academic term, COMPASS presents students with a wide variety of opportunities for integration into the campus community, including meeting and getting to know faculty, staff, and students; learning about campus resources, where to obtain specific services, and how to transact business; finding out where to get help, etc. All new students must participate in COMPASS prior to attending classes for the first time.

Camp COMPASS, an optional off-campus leadership development program, is offered each Summer and Fall to new students. Our orientation leaders as well as camp staff, work together to provide a robust leadership experience. We encourage new students to take advantage of this unique program, designed to jump-start their first-year experience.

Kettering Student Government

Kettering Student Government incorporates the Student Senate, Operations Council, Academic Council, and Finance Council. Each year, the student body elects class representatives to the Student Senate, along with the Student Senate President, Vice President, and Administrator. This group's primary charge is to determine student needs and set guidelines and priorities for meeting these needs.

The Student Senate oversees the general operation, approves planned programs and budgets, and makes certain that the actions of the Operations Council and Finance Council are consistent with the Student Government Constitution. The Student Senate also hears any appeals or grievances brought before it involving matters of constitutional interpretation.

Kettering University Clubs and Organizations Recognized by Kettering Student Government (KSG)

KSG recognizes and supports a variety of campus clubs and organizations that operate under the Constitution of the Kettering Student Government. Students may obtain further information regarding these groups and procedures on how they can start their own through the Student Affairs office and in the Student Handbook.

Fine and Performing Arts

Kettering University is committed to providing a well-rounded education to our students. We are able to offer opportunities to participate in band, choir, piano, and guitar lessons. Professionals from the Flint Institute of Music provide instruction.

Fraternity and Sorority Life

Fraternities and sororities have played an important role in the collegiate experience at Kettering since the school's beginnings in the early 20th century. Currently, nearly 40% of our students belong to Greek organizations, which include 11 IFC fraternities and two NPC sororities in A Section, 10 IFC fraternities and two NPC sororities in B Section, as well as one co-ed literary society in B Section and a city-wide NPHC which includes three fraternities and two sororities for both sections. Greek organizations offer many opportunities to meet new people, build life-long friendships, practice and hone leadership skills, and, in many cases, provide a home away from home through available housing. Members are expected to strive for academic excellence and serve local and national communities by donating time and raising money for various philanthropic causes. See the Student Handbook for more information on Kettering's Greek Community.

Kagle Leadership Initiatives (KLI)

Through the Kagle Leadership Initiatives (KLI), Kettering students nurture academic excellence and promote urban leadership qualities and civic engagement among Flint area youth and their families to increase college attendance and graduation and foster life-long community involvement. KLI sponsors a variety of enrichment programs and activities, including mentoring, tutoring, coaching, and targeted special seminars such as taking the ACT/SAT, gaining admission to college, finding financial aid, and managing peer pressure and social acceptance. Students who are interested in making a difference in the Flint community are encouraged to apply. Application dates vary throughout the year.

Recreation Services

Recreation Services provides facilities and programs to meet the recreational interests of the Kettering University community, which includes students, faculty, staff, alumni, and their immediate families. Opportunities exist to practice and learn skills that lead to a healthy and satisfying lifestyle. Numerous competitive and cooperative activities provide an ideal environment to test one's skills and value system. Specific attention is devoted to addressing students' needs and balancing the academic rigor for which Kettering University is known. Recreation Service programs and facilities are rooted in student ability and desire. Students are employed to operate facilities and conduct programs. Kettering University students use the recreational opportunities as a stress release mechanism and as a means to fitness.

The Recreation Center features an open multi-sports forum with both wood and synthetic flooring. The hardwood courts are designed for basketball and volleyball, while the two synthetic multipurpose courts cater to tennis, pickleball, and indoor soccer. These areas are also used for various Robotics and Drone competitions, along with multiple employment fairs throughout the year. Other amenities include two racquetball/wallyball courts, one squash court, a 1/8 mile suspended jogging track, locker rooms, steam rooms, a 25-yard six-lane pool, spa, group exercise room, fitness room with exercise equipment, two weight rooms featuring Cybex equipment, equipment issue area, Student Lounge, Sargent Alumni Lounge, and professional staff offices. The facility is used for formal recreational sports programs (intramurals and club sports), informal recreation activities, fitness programs, and other Kettering University events. Reservations and drop-in play are accommodated.

On Campus Student Housing

Frances Willson Thompson Hall provides an on-campus living and learning community for all students. Several living options are available, including gender-neutral, single-gender, and 24-hour quiet units. Thompson Hall's design affords maximum individual privacy; each resident occupies their own room within units of 20-30 residents. The residence hall is air-conditioned, heated, and networked for the Internet. Each student's room is equipped with a bed, desk, dresser(s), bookshelf, closet space, a Micro Fridge, and a computer jack. A new style of housing is also available. The Super Suite is an upgraded traditional room that includes a bedroom connected to a living room-style setup. The suites include a double-size bed, desk, desk chair, dresser, and the living room includes a sofa, an armchair, a Micro Fridge, and a media unit. The

Resident Assistants [RA's] staff individual units. RAs and professional staff carry out programs and activities that contribute to students' personal development.

All first-year students, including transfer students, are required to live in Thompson Hall for a minimum of two academic terms. Exceptions may be granted to students over 21 years of age, are married, have children residing in the student's home, or have previously completed a minimum of two terms/one academic year in a residence hall at a college or university. Students who meet at least one of these requirements may request a housing contract release. Release applications may be obtained from the Director of Residence Life and must be submitted at least two weeks before the first day of any term. Contact the director of residence life at reslife@kettering.edu.

Wellness Center - Counseling and Accessibility Services, and Student Health Insurance

The Wellness Center is located on the first floor of the Campus Center between BJ's Lounge and Thompson Hall. A licensed mental health professional is available in the center for students and to support faculty and staff. Students may also access the Ulliance Student Assistance Program, a resource provided for all students, which allows them to call or schedule an appointment with a licensed mental health professional 24/7. A licensed mental health clinician can also be accessed after hours by calling 810-762-9650. In partnership with other community organizations, the Center provides resources and programming to enhance students' knowledge for proactive decision-making regarding their overall wellness. Students seeking medical support will be directed to Hurly Medical Urgent Care, located near campus, and transportation assistance can be arranged if needed.

In compliance with the Americans with Disabilities Act (1990) and its amendments, along with state and local regulations, students can meet with an Accessibility Services coordinator to address classroom accommodations. The Center works with the student, faculty, and the Academic Success Center to address reasonable classroom accommodations.

All students must have medical health insurance during their academic tenure at Kettering University. There is an annual verification process for domestic students to obtain a waiver if they already have coverage. International students are enrolled in the student health insurance program currently provided by United Healthcare (UHC). Students who do not have adequate health insurance coverage for this area can also enroll in UHC.

For more information, contact the Center at wellness@kettering.edu or refer to the Student Handbook.

Campus Safety

Kettering University Campus Safety is committed to ensuring a secure and supportive environment for all students, faculty, and staff. Operating 24 hours a day, 365 days a year, our team is dedicated to promoting a safe learning and living atmosphere on campus.

Campus Safety officers provide a wide range of services, including:

#Student assistance and support

#Crime prevention and awareness programs

#Investigation of incidents and complaints

#Emergency response and management

#Routine patrols throughout the campus

#Centralized communication and information services

#Building security

#Safety and fire inspections

#Lost and found services

#Shuttle services for students or employees walking alone at night

#Safety shuttle transportation to nearby locations when other options are unavailable, particularly after dark

#Enforcement of campus parking regulations

Kettering University works in close collaboration with local law enforcement agencies to maintain safety both on campus and in the surrounding neighborhoods.

In the event of an emergency:

Dial 911 from any campus phone, or call (810) 762-9501 to reach the Campus Safety Desk Officer, who can dispatch emergency responders and provide immediate assistance

The Campus Safety office is located on the second (ground) floor of the Campus Center.

Dining Services

Kettering University has partnered with Creative Dining Services to deliver an exciting campus dining experience. The Battenberg Café, located on the first floor of the Learning Commons, offers expanded dining options where you can enjoy a quick bite on the go or a relaxed meal with friends. Choose from a variety of cuisines across eight unique food stations. On the second floor, you will find the Great Lakes Coffee Shop, where you can sip a cup of locally roasted Bulldog Blend coffee. Or treat yourself to a wide selection of beverages, from handcrafted lattes and iced teas to hot chocolate. You can also indulge in a delicious pastry, delivered fresh from Crust Bakery in Fenton, Michigan. Last but not least, in the evening, you can order personalized pizza at the Battenberg Café Order Window or visit BJ's Lounge, which features a specialty menu perfect for winding down after a long day.

Meal Plans

All first-year students who reside in Thompson Hall are required to purchase Meal Plan A during their residency. Commuter and Flexible Dining Dollars meal plans are also available to upperclassmen. All meal plans expire at the end of each academic term. Current information on the various meal plans and dining hours of operation may be found on the Kettering Dining Services website.

Flexible Dining Dollars

Flexible Dining Dollars are linked to a student's KU ID card and operate on a declining balance system. They are used exclusively for food purchases at any campus dining venue and expire at the end of each academic term.

Bulldog Bucks

All students have the option to purchase Bulldog Bucks, which can be used at all campus dining venues and the C-Store. In addition to food, Bulldog Bucks can be spent on Bulldog Wear items and are purchased at

a one-to-one dollar-to-buck rate through the KU Wallet online application. Unused Bulldog Bucks expire upon graduation, withdrawal from the University, or the end of employment for faculty and staff.

Students may also purchase groups of 5, 10, or 20 meals with the Block Meal Plan, which allows a set number of meals at the Battenberg Café simply by swiping your ID card. Block meals are a bit different in that they do not expire at the end of the term in which they are purchased; instead, they remain valid through the end of the academic year (spring term).

The C-Store

The on-campus convenience store, commonly known as the “C-Store,” is located in the southwest corner of the Campus Center (CC), just off the Great Court within the Sunset Café. The C-Store offers a variety of convenience items, including snacks, f’real milkshakes and smoothies, Starbucks coffee and lattes, as well as everyday essentials. In addition, you’ll find "Bulldog Wear" apparel and official Kettering University merchandise available for purchase.

For the most up-to-date hours of operation, please visit the Dining Services website. The C-Store accepts cash and all major credit cards (Visa, MasterCard, American Express, and Discover). Students may also use Flexible Dining Dollars for food purchases and Bulldog Bucks for both food items and Kettering-branded merchandise.

The Online Bookstore

The Online Bookstore is a virtual bookstore operated by MBS Direct/BNC for the University. MBS Direct/BNC offers new, used, rental, and digital textbooks, including Book Buyback and Guaranteed Buyback options. The online bookstore accepts Visa, MasterCard, American Express, and Discover credit cards, Visa and MasterCard debit cards, as well as PayPal (except Marketplace orders), check, money order, and/or book vouchers.

The Online Spirit Store

Kettering Bulldog Wear is a virtual spirit store operated by Advanced Online that offers official Kettering Bulldog apparel, accessories & gifts. They accept Visa, Mastercard, American Express, and Discover credit cards as well as PayPal.

Shipping & Receiving

Located on the first floor of the Academic Building, Shipping & Receiving offers convenient mail and package services, including mail delivery, package pickup through smart lockers, and package drop-off. Postage stamps are also available for purchase.

The hours of operation are Monday through Friday, 8:00 a.m. to 5:00 p.m.

For your convenience, we offer packing supplies such as bubble wrap, packing paper, shipping tape, and boxes (available at a nominal cost).

For more information, please contact supply@kettering.edu.

Electronic Vehicle Charging Stations

In partnership with ChargePoint, Kettering maintains two electric vehicle charging stations on campus. One station is located in the visitor lot outside the Campus Center and is intended for guests. The second dual station unit is located in the parking area south of the Campus Center and is intended for faculty, staff, and student use. In order to use the charging station, you must be enrolled in the ChargePoint program. You can join for free by visiting ChargePoint.com. In order to activate access to the Kettering Charging Stations, contact the Director of Environmental Health and Safety (nthor@kettering.edu) for instructions and to obtain a connection link. You can download the mobile app to find stations, check availability, and more.

CO-OP AND CAREER DESIGN

Co-op and Career Design is the key experiential learning component of Kettering University's academic program. It is best exemplified as a three-way partnership agreement between a student, an employer, and the university. The purpose of the program is three-fold:

1. To develop a strong, positive connection between a student's academic program and their Co-op work experience.
2. To provide educational experiences that orient and integrate the student into productive and professional roles with their Co-op employer.
3. To create positive work-related habits, characteristics, and transferable skills that promote professionalism, ethical behavior, diversity, and global awareness.

Requirements

Co-op at Kettering University is based on an alternating full-time schedule. Students alternate 11-week academic terms with 12-week terms of progressively challenging work with an approved employer. Students will also participate in professional development modules designed to integrate academic and work experiences at key points in their progression. The minimum requirement for a work term is six weeks (240 hours) worked to receive credit for the term*.

Students who complete their academic requirements in nine full-time terms or more must complete at least five satisfactory work terms. Three of these five must occur after achieving Junior 1 status.

Students who complete their academic requirements in eight full-time terms (minimum of 16 earned credit hours per term) must complete at least four satisfactory work terms. Three of these four must occur after achieving Junior 1 status.

Students transferring to Kettering University with 24 - 55 earned hours (sophomore status) must complete at least four satisfactory work terms. Three after achieving junior status. The work experience terms must be earned while a Kettering University student.

Students transferring to Kettering University with 56 or more earned hours (junior status) without a baccalaureate degree must complete at least three satisfactory work terms. The work experience terms must be earned while a Kettering University student.

Students transferring to Kettering University with a baccalaureate degree must complete at least three satisfactory work terms. The work experience terms must be earned while a Kettering University student.

Student Coach/Employer Liaisons

Serve as a liaison between the employer partner, the student, and the university. They help address any concerns and ensure a successful co-op experience for all parties. Student Coaches are highly qualified professionals, a valuable resource, who coach students throughout the entire experiential learning program. Students will learn career-readiness skills and enhance their professionalism by following the advice of their student coach.

The Co-op and Career Design team also develops and maintains employer relationships and promotes co-op positions to students seeking employment. The co-op office maintains the employment records of all students in the Kettering Connect system. It is therefore essential for students to update their student coach on any changes to their employment status as they work toward meeting co-op requirements.

Academics

Students placed with a co-op employer are expected to be in good academic standing. Many employers have specific grade requirements, and it is the student's responsibility to know what those requirements are and any resulting consequences of not meeting them. Students whose cumulative GPA falls below 3.0 may be in jeopardy of being released from their co-op assignment from those employers that have a minimum GPA requirement. It is the student's responsibility to submit their grades to their employer if required. Students with poor academic performance may be required to complete consecutive academic terms successfully before being allowed to search for employment. Students must complete the Altering the Academic/Work Sequence process initiated with the Academic Success Center and consult with their Student Coach with questions about this process. Locating positions for students with unsatisfactory academic performance can be challenging. Students who are on academic probation and/or have been released for cause by their employer may forfeit their right to university assistance in finding new co-op employment until they satisfy the University's set requirements.

The Alternating Sequence

Each student assumes responsibility for maintaining satisfactory progress toward their degree. This includes following an alternating sequence between school and work while enrolled (two school terms and two work terms per academic year). This alternation schedule is determined based on the student's section status (A or B section) noted below.

Term	A-section	B-section
Summer: July - September	School	Work
Fall: October - December	Work	School
Winter: January - March	School	Work
Spring: April - June	Work	School

Any changes to this school/work sequence must be approved in advance through the petition process. Refer to the Academic Policies and Regulations (p. 59) section of this catalog (Petition to Alter Academic/Work Sequence) for more information. Incoming freshman, B-section, are not required to secure a co-op in July, prior to attending school in October, Fall term.

Continuous Growth

The cooperative education partnership is designed to achieve our students' educational and career goals in conjunction with meeting the future talent needs of the co-op employers. Co-op is an academic program, and Kettering students are encouraged to remain with the same employer throughout the entire program. Experience has shown that, in most cases, it is more advantageous for the student to progress within one organization than to change from one to another. Each time a student begins with a new company, they start over in the learning process and are often given less responsibility until their learning curve increases. Partnering with the same employer throughout the entire program has proven to increase opportunities and the level of challenge afforded to the student.

The program provides numerous opportunities for students to develop technical, essential, and career-readiness skills. Participation in professional development seminars, one-on-one coaching meetings with co-op managers, and training and mentoring with co-op employers will enhance a student's confidence and marketability. The university encourages students to seek out and take advantage of these additional, often informal, learning resources.

There are appropriate reasons for some students to request a new co-op employer or for an employer to terminate a student. This process is referred to as Reassignment. Students seeking reassignment must meet with their Student Coach to help determine if the process is necessary. Kettering will approve reassignment after it has been determined that it would be in the student's best interest and the employer (see below: Changing Co-op Employers). Changes in a co-op assignment are permitted but are not granted solely on the basis of student financial gain, personal commitments, or assumed responsibilities. The cooperative relationship intends to meet both the student's and the employer's goals, but not at the expense of the other. A healthy respect for both is needed to maintain a successful program.

In the spirit of continuous growth and recognition of the comprehensive student experience, the co-op office liaises with other student-centered offices to best serve the needs of our students. Shared student support and solutions with the Academic Success Center, Office of the Registrar, Student Affairs, Office of International Programs, Wellness Center, and other departments enhance success. The co-op team encourages students to be proactive in engaging with student support teams.

Other Experiential Learning Opportunities

Kettering University offers an array of experiential learning opportunities that can be interchanged or used to greatly enhance our students' co-op experiences. The best examples of these experiences include:

- On-campus co-op opportunities (limited/specific requirements to be eligible)
- Internships
- Research opportunities
- Entrepreneurship opportunities

Students interested in integrating some of these options should work closely with their Student Coach in conjunction with their degree departments.

Selection by a Co-op Employer

Resumes of eligible students are forwarded to co-op employers by the Student Coach/Employer Liaison or various other means, such as Co-op Employment Fairs, personal referrals, or self-selection via our Kettering Connect system, where employers may post their positions online for students to review. Careful attention is given to student objectives, interests, needs, and preferences. While most students obtain co-op employment through these efforts, students are equally encouraged to assist in the process by initiating contact with potential co-op employers through their own personal networks. The Kettering Student Coach will work with students who wish to pursue new co-op employers. All employers must be approved and entered into the database in order for students to receive credit for their work terms.

Co-op employers choose to interview an applicant based on the student's academic background, employment history, skills, extracurricular activities, and honors. Factors that may influence selection by a co-op employer include communication skills, leadership potential, career interests, desire to work, and the capacity to acquire the necessary academic and practical experiences that lead to greater responsibility.

Section Assignments

A-Section students begin school in July; B-Section students begin school in October. Kettering University assigns students to a section based on space and class-load balance. The University will attempt to meet student requests, but has the right to determine section assignments. Co-op employers may also request section assignments for students based on their co-op hiring needs.

Registration

All students are automatically registered in their cooperative work experience term according to the alternating sequence. Students are allowed to register for a maximum of eight credits of coursework at Kettering University while registered for a co-op or thesis term.

Students may not adjust their alternating academic and work term sequence without approval. This ensures that all relevant university offices are aware of the changes in the students' plans. As such, arrangements made between students and employers without university approval will result in no co-op credit granted for the term. It is the student's responsibility to submit the completed, signed form to the Office of the Registrar so that the appropriate registration adjustments are made. Please note that students may not request to complete more than 2 consecutive co-op terms.

Grading System

To receive a satisfactory grade for a co-op work term, each student must have on file both the Supervisor and Student Evaluation of the co-op experience and evidence of completing a Work-Term Reflection. The supervisor's evaluation of the student's co-op experience should be reviewed with the student and then signed by the employer. During a co-op work term, students generally work full-time (40 hours) a week, and in some cases, are required to work overtime or various shifts depending on the employer's needs. A student hired later than the start of the term or released before the end of the term (except under extreme conditions) must work at least six weeks (240 hours) of the twelve-week term and receive a "satisfactory" grade to have their work experience count toward graduation requirements.

Professional Development Modules

Cooperative Education learning is fully integrated into our academic and educational programs and supports the University's learning outcomes. Over the course of their academic career, students will participate in professional development modules designed to reflect upon, plan for, and be intentional in their personal work experiences.

Work Experience Evaluations

During a cooperative work experience term, the student's performance is evaluated by the student's supervisor, who is assigned for that term by the co-op employer. This evaluation is required by Kettering and is kept on file for five years after graduation or separation from the University. The terms are evaluated on a "satisfactory/unsatisfactory" grading format. No academic credit hours or quality points are earned through the work experience requirements of the program.

S = Satisfactory evaluation received (credit awarded)

U = Unsatisfactory evaluation received (no credit awarded and Academic Standing impacted)

NR = One or both evaluations were not received or were not signed by the student or the employer.

Students Released From a Co-op Employer

Students released from an employer one or more times based upon performance will be required to meet with the Cooperative Education Director, Academic Services, and/or the Associate Dean of Student Engagement and Success. Students could be required to work on campus as they acquire personal and professional development skills before returning to the workplace. If a student is released due to grades, they may be required to take back-to-back school terms with a reduced number of credits to improve their academic standing.

Changing Co-op Employers

It is strongly encouraged that students work at least two (2) work terms with an employer before they petition for reassignment. Students desiring a change in co-op employer must meet with their Kettering University Cooperative Education Manager to discuss the reason(s) for the request. Requests for reassignment must be approved by the Cooperative Education Manager or Review Team. If it is determined that reassignment is the best option, prior notification to their current employer will be necessary before a new job search process is initiated. Students should not initiate a discussion with a prospective new employer without the Cooperative and Experiential Education Office's knowledge and approval.

It should be emphasized that any deviation from this policy, or unilateral student action, to secure a new co-op employer without prior approval may result in that student jeopardizing receiving work experience credits for graduation and/or being placed on probation. It is imperative that we maintain good relationships with our employer partners, in addition to assisting students in successfully negotiating change.

The Cooperative and Experiential Education Office will assist students who are granted permission to seek new co-op employment. All students available for reassignment will be given access to the current co-op database, enabling their resume to be sent to co-op employers currently seeking students with similar profiles (academic major, skills, etc.).

Reassignment Process

Reassignment requests are considered on a case-by-case basis. To submit requests, students must follow these steps:

- Make an appointment with your Student Coach before pursuing reassignment, preferably at the beginning of a term (or by the 3rd week).
- The Student Coach will work with the student to determine if reassignment is the right step.
- Documented reasons for the reassignment will be noted by the Student Coach in the student's file for future reference.
- If pursuing reassignment is agreed upon, the student will be required to complete the following:
  - Employer Notification - A phone call to the employer followed by a formal resignation email, including the Student Coach
  - Reflection Form (for terminations)
  - Written approval for passed health screenings (for terminations only)
  - Ensure copies of the following are accurate and up-to-date:
    - All evaluations, both student and employer, are complete
    - Updated resume uploaded to Kettering Connect is required

The Student Coach will preview all submitted materials and make a decision. The Co-op and Career Design Office is prepared to help guide and assist all students as they continue to grow with their organizations and move toward graduation. The student is required to contact their Student Coach for advice and counsel before making any change to their cooperative education program. The reassignment timing should occur at the end of the work term or within three (3) weeks of the academic term. This ensures both the student and the employer have adequate time to prepare.

Transfer of Work Experience

Students who have participated in other comparable college-level cooperative work experience programs or who believe they have significant work experience related to their Kettering degree program may be eligible to transfer this work experience toward their Kettering degree requirements. Students wishing to pursue such action should contact the Co-op and Career Design Office to determine the documentation necessary to transfer a maximum of two work experiences. These work experiences will apply toward the student's freshman and sophomore level experiences only.

Students without a Co-op Employer

Students who are not employed by the start of their work term can complete a back-to-back academic term. This choice will require students to fill out the Altering the Academic/Work Sequence form and gain the necessary signatures from their Student Coach, Academic Success Center, and Registrar's office. Students seeking employment while attending classes must maintain a current resume, attend seminars on employment search skills, and apply for positions. They must be easily reached and available for interviews with prospective employers and be proactive in the co-op search process with the Student Coach's assistance.

Locating positions for students with unsatisfactory academic performance can be challenging. Students who continue to remain on academic probation and/or have been released for cause by their employer may forfeit their right to university assistance in finding new co-op employment. These students should immediately make an appointment with their Student Coach/Employer Liaison.

Cooperative Education Program Student Agreement

Students acknowledge their understanding of the co-op program and policies via the Cooperative Education Program Student Agreement in Kettering Connect. Active student involvement and participation are paramount to a student's co-op success.

Behavioral Standards and the Kettering University Code of Student Conduct

The Kettering University Code of Student Conduct represents a body of behavioral standards for all students. These standards are strictly and vigorously enforced by the University to ensure members of this educational community a productive, safe, and equitable environment for growth and development. The University expects its students to conduct themselves as mature individuals while enrolled at Kettering, wherever

they are located, including on campus, at home, and in their work section communities.

Students are expected to comply with all University regulations governing student conduct and the use of University property and facilities. Kettering University has the right to take action and investigate any offense that involves our students, either as victims reporting or students accused of violating the Code of Student Conduct or any federal, state, and/or local laws/ordinances. The Code of Student Conduct extends to students at their places of co-op employment. We expect students to honor their co-op employer's standards for workplace demeanor and may impose our Judicial Affairs procedures upon any student charged by an employer with workplace misconduct.

Student Concerns and Complaints

Refer to the Academic Policies and Regulations (p. 59) section of this catalog, under Student Complaint Procedures.

CULMINATING UNDERGRADUATE EXPERIENCE: THESIS

The Culminating Undergraduate Experience: Thesis (p. 117) represents a Kettering student's crowning achievement – the tangible proof of growth, knowledge, understanding, and mastery of applicable, real-world skills necessary to transition to professional status upon graduation. All Kettering University baccalaureate programs require completing the Culminating Undergraduate Experience, also known as the Senior Thesis. The Senior Thesis is a professional document describing a comprehensive project managed and performed by the student. The project is generally performed for the student's co-op employer (p. 52) (Co-op Thesis); however, with employer permission, the student is eligible to pursue another option for their thesis: Research Thesis project (with degree program faculty) or Entrepreneurship Thesis project (a comprehensive business plan based on a student idea for a new business, new product, etc.). Students become eligible to conduct work on the thesis when they have earned a minimum of 88 credit hours (senior I standing). The thesis is an academic requirement, taking approximately 240 hours to complete the objectives of the project work and additional time to write the thesis manuscript. The focus of this project may be a product, system, creation of a comprehensive business plan, investigation and experimentation of a new idea, etc. Students are introduced to the thesis through an online introductory assignment accessible during their junior II co-op term upon earning 72 credit hours. Four (4) credit hours are awarded upon completion of the thesis, and the student will earn a grade of pass with distinction or pass upon faculty approval of a Kettering standardized written thesis manuscript.

Please Note: Students facing challenges in completing their thesis requirement, including students who have completed all other graduation requirements, are to contact the Academic Success Center - Thesis Office (ASC - Thesis Office) for immediate advisement at thesis@kettering.edu.

Thesis Options and Finding a Thesis Topic

For all thesis options, the student is responsible for finding a topic for their thesis project. If the student cannot secure a thesis project through their co-op employer, with employer approval provided by the company to the ASC - Thesis Office, the student can pursue one of the non-co-op thesis options.

Co-op Thesis

A topic idea for the Co-op Thesis project is determined by the employer and student; a project the company needs to be performed; and a topic that is of value to the employer. The student manages the project from start to finish and performs the majority of the work. The student is required to complete and submit a thesis topic proposal (Student Thesis Module 2 of 4) in Kettering Connect to obtain topic approval before starting the work on the thesis. Upon submission, the thesis topic proposal is electronically forwarded to the student's co-op Employer contact and degree department for evaluation. Upon approval, the student is notified via e-mail of their assigned Faculty Thesis Advisor and acceptance to begin work on the project.

Research Thesis

The Research Thesis focuses on conducting research (most often) on campus with a Kettering faculty member. It is an opportunity for the senior student to apply their academic and co-op experience to investigate and experiment with new ideas. Usually, the topic is provided by a Kettering faculty member in the student's degree department. The student is required to complete and submit the Research Thesis Proposal (Student Thesis Module 2 of 4), which is available in the Kettering Connect software tool. The projects are limited and students are selected based on their expertise matching the project scope. For more information contact your degree Department Head or appointed Thesis Administrator within your degree department.

Entrepreneurship Thesis

The Entrepreneurship Thesis focuses on a student-generated idea. An applicant for an Entrepreneurship (E-ship) Thesis project will formalize a comprehensive business plan that can be used in an effort to secure funding for the establishment and/or expansion of a new or existing operating venture. The student must complete and submit the E-ship Thesis Proposal (Student Module 2 of 4) form available in Blackboard by requesting access to thesis@kettering.edu. Upon submission, the proposal is evaluated by the School of Management. Upon approval, the student is notified via e-mail of their assigned SBDC advisor in the Small Business Development Center - SBDC (located on campus and funded through the State of Michigan) and their Faculty Thesis Advisor and acceptance to begin work on the project.

Please note: Students who have exhausted all efforts to identify a thesis topic are encouraged to contact the ASC - Thesis Office.

Culminating Reflection Project (Alternative Thesis)

The Culminating Reflection Project was developed in response to disrupted thesis projects due to the COVID-19 pandemic. This project will remain available case-by-case until the Office of the Provost determines it is no longer needed.

The Culminating Reflection Project is comprised of three distinct and diverse experiences from the student's college career. The project asks the student to reflect upon how these experiences contributed to their growth and development.

Student Process

Students will be acclimated to the thesis on their junior II co-op term through an online introductory assignment. Upon topic approval through completion, students will have two advisors who will serve as mentors. The manuscript will be assessed by the student's Faculty Thesis Advisor; additionally, for Research Thesis or Entrepreneurship Thesis students, the Committee Member will review the manuscript. If the co-op employer deems the thesis confidential, Kettering has a standardized Confidential Thesis Agreement available in Blackboard. Students must complete four University thesis modules through their thesis experience, including Thesis Introductory Assignment in Blackboard - Module 1, Thesis Topic Proposal - Module 2, Thesis Progress Report - Module 3, and Thesis Manuscript Submission - Module 4.

Registration

Students who achieve junior II standing (72 credit hours) and are registered in a co-op term will be automatically registered for the Thesis Introductory Assignment (Student Thesis Module 1 of 4), CILE 400. Additionally, upon completion of the thesis, the ASC - Thesis Office submits a final passing grade to the Office of the Registrar, and the 2nd thesis registration (CILE 401) is posted to the student's record to reflect the four credits earned.

Additional University Policies to Encourage Completion of Thesis Requirement:

- **Active/Not Enrolled Registration (Thesis Extension Terms)** - Students who do not complete their thesis requirement by the end of their last required academic term are automatically enrolled in their first active/not enrolled term (thesis extension term). Students will be required to demonstrate progress on their thesis with a required plan and advisement session through the ASC – Thesis Office within this term (required due date set by the ASC – Thesis Office). If the ASC – Thesis Office determines student progress is made, the student will be registered into an additional active/not enrolled term with a maximum of four active/not enrolled terms.
- **Academic Completion of Overdue Co-op Thesis -** Students may complete an overdue Co-op Thesis to meet their thesis requirement. The Faculty Thesis Advisor will review the student's written thesis manuscript for academic completion. It is due to one of the following reasons: The sponsoring Co-op Employer no longer supports the thesis and makes a determination not to sign off on the thesis (official co-op employer required to the ASC – Thesis Office) or twelve (12) months have passed since the last day of the student's last academic term.
- **All But Thesis: 10 Year Out -** Students who have completed all degree requirements except the thesis and whose last academic term was more than 10 years ago are eligible to write a narrative of two significant projects through their professional experiences applicable to their Kettering degree program. The narrative will be reviewed by a faculty member in the student's degree department.

For more information about the Kettering University Thesis Program, please contact thesis@kettering.edu.

PROFESSIONAL DEVELOPMENT AND FIRST YEAR EXPERIENCE

The Professional Development and First Year Experience programs are housed within the Academic Success Center (ASC) to promote best practices for student success by integrating the academic and professional experiences, in which all students participate.

Professional Development

Cooperative and experiential learning is fully integrated in our academic and educational program and supports University learning outcomes. Over the course of their academic career, in cooperation with the Cooperative Education Office, students participate in professional development modules designed to allow them to reflect upon, plan for, and be intentional in their personal work experiences.

First Year Experience (FYE)

The primary goal of FYE is to build a strong foundation for student success during the time of transition from high school to college. Kettering students experience not only a personal and academic transition but also a professional transition as they embark upon their first co-op experience. FYE fosters a sense of belonging for students in the Kettering campus community and provides informative solutions for students.

CILE 101

The CILE101 First Year Foundations course provides critical information on personal, academic, and professional development for first-year students. Class discussions support student's engagement in the Kettering community, makes important connections for students to develop a sense of self-governance, and sets a foundation for both a critical thinking and reflective learning mindset. Students learn to successfully interact in the academic and cooperative work environment. Mentoring and interaction with the instructors provide support and guidance for students to be fully integrated into Kettering University. Discussions and assignments enhance student transition and acclimation to Kettering University and the workplace.

Instructional Model

Small groups of students meet for one hour per week to discuss academic and professional development topics to enable a successful transition to Kettering University. There is an instructor along with an upper class peer mentor leading the classroom experience. A flipped classroom approach delivers relevant content as asynchronous video or text modules, allowing more time for classroom discussion. Assignments outside of class time average less than one hour per week.

ACADEMIC POLICIES AND REGULATIONS

All faculty and students are urged to review and understand the University's Academic Policies and Regulations. The chapters under this section are intended as a convenient reference for faculty, staff, and students. It also serves as a description of the student's academic rights and responsibilities and as a guarantee of equitable treatment for all students. Some sections may reference other areas of the catalog when necessary. Each section also concludes with the name of the person or office to contact with questions.

Academic Advising/Support; Academic Standing

Academic Advising and Support

Kettering University provides several academic support services for students. All services listed below are accessible to all students and available at no additional cost during work and academic terms.

Advising and Coaching

Advising is a collaborative teaching and learning process that, by intention and design, facilitates students' understanding of higher education's meaning and purpose while fostering intellectual, personal, and professional development. Advising at Kettering is delivered by professional advisors within the Academic Success Center (ASC) and faculty advisors within the individual degree departments.

Students are encouraged to meet regularly with an academic advisor (at least once per academic term) to discuss short- and long-term goals, determine progress toward degree completion, and address any questions or concerns.

Each academic department has its own process for facilitating academic advising. Advising within the Academic Success Center is scheduled through the ASC website by contacting academicsuccess@kettering.edu, or students may drop in on Walk-in Wednesdays.

Success coaching is provided by the ASC advisors to help students become more effective and successful. While meeting with advisors for success coaching, students may work on time management, study strategies, test-taking, note-taking, organization, and more. Success coaching appointments with an advisor can be requested through the ASC website by contacting academicsuccess@kettering.edu, or students may drop in on Walk-in Wednesdays.

Academic Support

The ASC provides a wide range of academic support to Kettering University students. Peer Tutors assist students with subject knowledge in various undergraduate courses–especially foundational mathematics courses. Select courses, typically math and physics, are supported through the ASC Lab. ASC Lab Weekly Happenings in the LC provide students with a structured, peer-led, and collaborative group-study environment in which students can actively engage in reviewing and studying material. Sessions are offered weekly and may vary from term to term. They are open to all students in the designated courses. The ASC Lab-supported courses and Peer Tutors' schedules are on the ASC Lab website. The ASC also provides writing support through various platforms and Peer Tutors. There are additional opportunities for students to seek support for their courses through online platforms, which they may access through the ASC website, MyKettering, and our learning management system, Blackboard. ASC Advisors and student support staff can assist students with navigating where to find each resource.

Testing Assistance

The ASC provides an alternative testing space for students enrolled in Kettering University courses who require ADA accommodations. These accommodations may include extended test time, individual testing space, reader/scribe support, or other necessary accommodations. Any student seeking accommodations for testing must first meet with the Wellness Center to determine and approve all necessary accommodations. This must be done at the beginning of every academic term.

Testing services are not available for students taking courses at institutions outside of Kettering University as guest courses, for students who have a testing conflict and do not have ADA accommodations in place, or as an alternative to virtual testing.

Academic Standing

Kettering University has four levels of academic standing: Good Standing, Academic Warning, Academic Probation, and Academic Review. The four levels are discussed in detail below.

ASC Flowchart for academic standing

Good Standing

To be in good academic standing, a student must meet all of the following criteria:

- Term GPA ≥ 2.0
- Cumulative GPA ≥ 2.0
- Co-op grade of Satisfactory

Academic Warning

Students are placed on Academic Warning when the criteria for good standing are not met following a completed term. Students on Academic Warning are strongly encouraged to work with an advisor in the ASC to develop a plan for improvement to return to Good Standing. Students on Academic Warning should also utilize additional support services across campus, including tutoring, supplemental instruction, the Wellness Center, faculty office hours, etc.

Academic Probation

Students are placed on Academic Probation if they do not meet the criteria for good standing following the Academic Warning term. Students on Academic Probation must meet with an ASC advisor to develop an Academic Improvement Plan (AIP) indicating critical strategies to improve their academic standing. The AIP may be shared with other departments if requested for other uses, such as a Financial Aid Improvement Plan or if the student moves to Academic Review. An academic advisor in the ASC will be assigned to all students on Academic Probation and will contact that student at the start of the academic term.

*Students on probation are encouraged ***not*** to enroll in consecutive academic terms; however, once final grades have been posted in the previous academic term, they may request consecutive academic enrollment through the ASC.

Academic Review

Students who do not improve their academic standing while on Academic Probation will move to Academic Review (AR). Once on Academic Review, the student has two options:

1. Withdraw from the university (AR Withdrawal) to avoid a permanent negative mark on the transcript.

2. Appeal to the Academic Review Council. See below for guidelines for writing an effective appeal.

Appeal to Academic Review Council

Academic Review Council (ARC) meetings are typically held in the 7th week of each term. The ARC comprises select faculty and staff members appointed by the Office of the Provost and will serve a 2-year assignment on the council. The ARC reviews all materials the student submits, including their appeal letter, which should summarize the circumstances that led to their academic standing. They should cite any extraordinary incidents that may have negatively impacted their academic performance and how these have been resolved, allowing their performance to be improved. Students may also include letters of support from faculty, employers, or KU staff and documentation that may validate their circumstances. Additional documents, such as doctor's notes, etc., are not required but may assist the ARC in making a more informed decision.

All documents must be submitted to academicsuccess@kettering.edu no later than 6th week Monday of the current academic term. No exceptions will be made. If the deadline is missed for the current term, they must wait until the following academic term to submit their appeal.

All materials submitted to the ARC are reviewed, with the student's identity remaining anonymous. Information from the Academic Success Center regarding their engagement with support services across campus may also be shared with the ARC.

The ARC will assess each student individually and determine whether the student will be:

- Kept with conditions
    - A student can complete a conditional academic term to improve their GPA and return to good standing.
- Dismissed with the opportunity to return
    - The student must follow the process below to return to Kettering University and complete their degree.
    - NOTE: Permanent dismissal from the university is unlikely to result from the first ARC appeal.

Kept with Conditions

Students kept with conditions per the ARC will receive notification through their Kettering email. The following conditions will be required of the student during their AR-conditional academic term:

- Must pass all courses in their AR-conditional term. (Specific final grade requirements may be put in place by the ARC)
- Must not drop any courses without first discussing the reasoning with an ASC advisor.
- Must meet with their assigned ASC advisor following the meeting time and frequency they determine with the student.
- Must achieve Good Standing at the end of their conditional term.
    - If the student's cumulative GPA is below 2.0, and more than one term is required to achieve the cumulative 2.0 minimum, the term GPA will only be factored into this requirement and must be above the 2.0 term minimum to be considered for continued enrollment.
- Registration for the conditional term will be reviewed and approved by the ASC. The ARC and/or ASC advisor may recommend changes to this registration.
- Other criteria as determined by the ARC.

Once the conditional term is completed, the ARC will review the student again anonymously during the following academic term's 7th week ARC meeting. The ASC advisor will provide information regarding the student's progress and engagement with the expected conditions. The student may provide a statement summarizing their progress in the AR-conditional term to the ARC and must be sent to academicsuccess@kettering.edu no later than the 6th week Monday of the term following their AR-conditional term. A summary is not required but may be helpful for the ARC to assess the student's situation better. It is up to the student to submit a statement following their AR-Conditional term to the ASC. They will not receive a reminder.

If the ARC determines that the student did not adequately meet the AR-Conditions, the student will be permanently dismissed from the University. If the ARC feels they have met the AR-Conditions effectively, the student will be permitted to register for their next term, expecting them to return to Good Standing.

NOTE: Back-to-back academic terms will not be permitted until they have returned to Good Standing.

Dismissal Following Academic Review Appeal

If the student appeals and the ARC determines that the student should not be kept at the University with conditions, the student will be notified through their Kettering email. They will be eligible to be readmitted following the conditions listed below under "Readmission Following Academic Review."

Dismissal Following Failure to Appeal

If a student who is up for Academic Review chooses not to withdraw from Kettering University or to appeal, the student will be automatically dismissed from the university. The student will be notified through their Kettering University email. They may petition to return following the "Readmission Following AR Dismissal/Withdrawal" process.

Readmission to Kettering

A student may request to be readmitted by contacting the Academic Success Center. An advisor in the ASC will discuss and assist with the Application for Readmission and any stipulations that may apply to them.

Readmission in Good Standing

Students who have been separated or withdrawn from the university while in Good Standing may request to be readmitted by contacting the ASC. An advisor in the ASC will discuss and assist with the Application for Readmission. If a student is re-entering in a different catalog year,

they may be subject to new catalog requirements and/or catalog and program changes. Readmitted students are subject to the tuition rate paid by the entering class at the time of re-admittance.

Readmission in Warning or Probation Standing

Students who have withdrawn from the university while on Academic Warning or Academic Probation may request to be readmitted by contacting the ASC. An advisor in the ASC will discuss and assist with the Application for Readmission. Students will be admitted back to the institution and remain in the academic standing they were in upon withdrawing. These students may be required to meet additional requirements upon readmission to ensure overall success. If a student is re-entering in a different catalog year, they may be subject to new catalog requirements and/or catalog and program changes. Readmitted students are subject to the tuition rate paid by the entering class at the time of re-admittance.

Readmission Following Academic Review

Students who withdrew or have been dismissed due to the academic review process may request to be readmitted by selecting one of the two paths to readmission. The first is Evidence-Based Readmission, which is available to all students. The second is Recommendation-Based Readmission, which is available only to students at a junior or senior academic level. Students may be subject to the catalog requirements effective the term they return; the Academic Review Council will make that determination. Readmitted students who do not return to good standing after one term and/or did not follow the recommendations of the Academic Review Council can be permanently dismissed. Readmitted students are subject to the tuition rate paid by the entering class of students at the time of re-admittance. Students may apply for readmission only once following Academic Review.

Evidence-Based Readmission [Available to all students]

The student must provide an official college transcript demonstrating academic success at another accredited educational institution.

The evidence-based path allows the student to be readmitted to the term starting no less than nine (9) consecutive months or three (3) terms after the date of dismissal. To be considered for evidence-based readmission, students must complete the following:

- Attend another accredited institute of higher education for at least one term as a full-time student, completing at least four (4) courses or 12 credit hours, earning a minimum grade of a B in each attempted course. The courses must be selected from one or more of the following areas – math, science, technology, engineering, computer science, or management – and must be related to and at a level commensurate with their Kettering degree program. The courses need not be transferable to Kettering, but they should not be redundant with courses already completed with grades higher than a C-. The student is strongly encouraged to meet with a KU ASC advisor to review the selected courses before registering at another institution.
- The student must provide an official college transcript demonstrating academic success at another accredited institution of higher education.
- Submit a letter requesting readmission to the ASC. The letter should include any relevant information regarding the student's commitment to their academic success and any changes they have made to ensure this. They may also include any applicable supporting documents, including letters of recommendation, proof of resources utilized at the other institution, etc.

Recommendation-Based Readmission [Available to juniors/seniors only]

The recommendation-based path allows a junior or senior to be readmitted to the term starting no less than six (6) consecutive months after the date of dismissal. The recommendation-based readmission comes with specific conditions, which must be met within the first term of return for students to remain enrolled. A mandatory condition is completing at least 12 credits with a 3.0 GPA, and no individual course grade below a C. Additional conditions may be imposed by the student's degree department and/or the Academic Review Council. The student will be permanently dismissed from the university if the conditions are not met. To be considered for recommendation-based readmission, students must complete the following:

- Submit a letter requesting readmission to the department head of the student's academic department. Dual-major students must submit the request to the department heads of both academic majors. The readmission request must also be submitted to the Academic Review Council. The letter should include an explanation of changes in the student's life that have significantly affected their potential for success at Kettering University. Include any applicable supporting documents.
- The student must request the department head(s) to submit a letter of recommendation outlining any additional conditions to the Academic Review Council.

All documents for readmission following Academic Review must be submitted to academicsuccess@kettering.edu by Monday of the 6th week in the term before readmission. All questions should be directed to the Academic Success Center at (810) 762-9775.

Conduct Expectations

Student Conduct

Ethics in the University

The mission of Kettering University rests on the premise of intellectual honesty in the classroom, the laboratory, the office, and at the examination desk. The very search for knowledge is impaired without a prevailing ethic of honor and integrity in all scholarly, professional, and personal activities. The principles of honor and integrity make it possible for society to place trust in the degrees we confer, the research we produce, the scholarship we present and disseminate, and the critical assessments we make of the performance of students. In order to achieve our goals of preserving, disseminating, and advancing knowledge, Kettering University expects all members of the community to be open to new ideas, to be governed by truthfulness, and to be considerate of the rights of others. We strive to foster these values in all our endeavors and will employ all possible means to discourage dishonest behavior in any form. We hold students accountable for their

choices and actions through the Code of Student Conduct, administered by the Associate Dean of Student Engagement and Success.

Kettering Code of Student Conduct

The Kettering University Code of Student Conduct represents a body of behavioral standards for all students. These standards are strictly and vigorously enforced by Kettering University to ensure members of this educational community a productive, safe, and equitable environment for growth and development. Kettering University students are expected to conduct themselves as responsible, mature individuals while on campus, at home, and in their work-section communities.

Students are expected to comply with all University regulations governing student conduct and the use of University property and facilities. Kettering University has the right to take action and investigate any offense that involves our students, either as victims reporting or students accused of violating the Code of Student Conduct and any federal, state, and/or local laws/ordinances. The Code of Student Conduct extends to students at their places of cooperative employment. We expect students to honor their co-op employer's standards for workplace demeanor and may impose our Student Conduct procedures upon any student charged by an employer with workplace misconduct.

Conduct for which students may be subject to disciplinary action falls into, but is not limited to, the following categories:

- Endangering people or their property.
- Obstructing the normal functions of Kettering University or a co-op employer.
- Theft or damage to property, including intellectual property, of Kettering University, a co-op employer, or any individual.
- Any willful damage to the reputation or psychological well-being of others.
- Threatening, intimidating, harassing, coercing, or verbally abusing another.
- Any physical violence directed at any member of the Kettering University community or a co-op employer.
- Unauthorized entry to, use of, or occupancy of Kettering University facilities or a co-op employer's.
- Any dishonesty, cheating, forgery, plagiarism, alteration of, or misuse of Kettering University documents, records, or identification, or a co-op employer's.
- Computer misuse while on academic or work term, at the University, or at co-op employment, including but not limited to:
  - Theft or other abuse of computer operations.
  - Unauthorized entry into a file to use, read, or change the contents or for any other purpose.
  - Unauthorized transfer of a file or files.
  - Unauthorized use of another individual's identification and/or password[s].
  - Use of computing facilities to interfere with the work of another student, faculty member, or university official.
  - Use of computing facilities to send obscene or abusive messages.
  - Use of computing facilities to interfere with the normal operation of the University's or a co-op employer's computer system.
- Violation of applicable public laws while on Kettering University-owned property, University or student-sponsored or supervised functions, a co-op employer's owned or controlled property, or at a co-op employer-sponsored or supervised function.
- Possession or use on campus or at a place of co-op employment of firearms, explosives, explosive fuels, dangerous chemicals, or other dangerous weapons, except as specifically authorized by Kettering University or a co-op employer.
- Use, possession, or distribution of narcotics or controlled substances except as expressly permitted by law.
- Possession or use of alcohol or marijuana on Kettering's campus; any underage possession or use of such.
- Failure to comply with directions of Kettering University or co-op employer officials acting in the performance of their duties.
- Conduct which adversely affects the student's suitability as a member of the Kettering University and/or co-op employment communities.

Academic Integrity

We believe fairness, openness, and intellectual honesty to be the keystones of our educational mission. We foster these qualities in all our endeavors and use all possible means to discourage dishonesty in any form. All members of the Kettering community should report academic dishonesty to the appropriate faculty person, as well as to the Associate Dean of Student Engagement and Success. Academic dishonesty prohibited at Kettering includes, but is not limited to, the following forms:

- **Cheating**
  Intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise.
- **Fabrication**
  Intentional and/or unauthorized falsification or invention of any information or citation in an academic exercise.
- **Facilitating Academic Dishonesty**
  Intentionally or knowingly helping or attempting to help another to engage in academic dishonesty in any form.
- **Plagiarism**
  Intentionally or knowingly representing the words, ideas, or images of another as one's own in any academic exercise.

Students found to have carried out any form of academic dishonesty are subject to the faculty member's scrutiny and sanctions, as well as Student Conduct policies and procedures.

Student Conduct at Kettering University

Student conduct serves and protects Kettering students by encouraging responsible behavior and civic competence. We expect students to develop their character by exercising self-discipline and taking responsibility for their actions. We also expect students to make themselves aware of the regulations governing them as members of the Kettering community. Student Conduct supports the academic mission of the university by promoting student development, fostering a harmonious and stimulating environment, and protecting the well-being of all students.

Student Conduct Policies and Procedures

Members of the Kettering community should contact the Associate Dean of Student Engagement and Success whenever a violation or suspected violation of Kettering's Code of Student Conduct takes place. The University will take appropriate measures to investigate each incident and decide how best to proceed: to dismiss the charges or to refer the charge[s] to a designated Conduct Officer. If the charges are referred

for further action, the Conduct Officer will hold a pre-hearing with the accused student[s]. The pre-hearing serves the following purposes:

- To explain Kettering University's conduct process
- To inform the accused of his/her rights accorded through the University's conduct process
- To inform the accused, in writing, of all charges
- To request that the accused write an official response to all charges
- To inform the accused of all available resolution options appropriate to the specific charges.

Student Rights and Responsibilities Provided by Kettering's Student Conduct Procedures

Any student accused of any violation of Kettering University's Code of Student Conduct will be extended the following rights and responsibilities:

- Formal, written notification of all charges to be heard at either an Administrative Hearing or a University Board of Student Conduct.
- Right to a timely hearing. The University has the right to establish deadlines for hearing a case, as well as hear a case in a student's absence should s/he fail to appear at the established time and place.
- Opportunity to review the conduct file, which will be presented at an Administrative Hearing or University Board of Student Conduct.
- Time to prepare a defense. Students will receive at least 48 hours' notice of the time and place of an Administrative Hearing or University Board of Student Conduct.
- Right to be present at an Administrative Hearing or University Board of Student Conduct.
- Right to have an adviser present at an Administrative Hearing or University Board of Student Conduct. The adviser must be a member of the Kettering University community and may advise the accused student but may not conduct the student's defense.
- Right to ask questions of any witnesses who appear at an Administrative Hearing or University Board of Student Conduct.
- The Associate Dean of Student Engagement and Success may determine that other Kettering University officials ought to be aware of the results and will inform them.
- Crime victims will be notified of hearing results in accordance with existing federal, state, and local laws.

Kettering University has the right to request a student return to campus during a work-term or off-term in order to expedite a case perceived as serious and pressing in nature. Students are entitled to the rights afforded by the Family Educational Rights and Privacy Act (FERPA). This act ensures that most communication between a student and the University is considered confidential and that such information about a student's experience can be shared with the parents of an individual student only under very specific circumstances as defined by federal law. All rights accorded to a student under the law take effect at the time of enrollment in a post-secondary educational program, regardless of the student's age.

Public Criminal Justice System Versus Kettering University's Student Conduct Process

Kettering's Student Conduct process differs in both purpose and function from the public criminal justice system. The University's process is designed to be educational and to afford students opportunities for personal growth and development. The criminal process is designed primarily to be punitive. Protections afforded to the accused are less comprehensive in Kettering's Student Conduct process than those extended in the criminal system. The University is not required to follow federal, state, and/or local rules of evidence. Instead, charges against a student need only be proven by "preponderance of evidence," i.e., such evidence as a reasonable person might accept as adequate to support a conclusion that the offense more likely than not took place. Criminal investigations and/or charges do not hinder or delay the University's responsibility to investigate and adjudicate allegations of student misconduct in a timely fashion.

Resolution Options

Administrative Hearing

In cases where charges do not appear to merit suspension or expulsion, or in cases in which the accused does not contest the charges, the Associate Dean of Student Engagement and Success may designate a Conduct Officer (CO). The CO will investigate the case and conduct a hearing with the accused. Administrative hearings accommodate all the rights and procedures accorded to students by the University's policies. Following the hearing, the University will provide the student with written notification of the results of the hearing, as well as information about the appeal process.

University Board of Student Conduct

The Associate Dean of Student Engagement and Success designate a conduct board or University Board of Student Conduct (UBSC) whenever charges may result in suspension or expulsion, including all cases involving academic misconduct. In these cases, a designated Conduct Officer of the University chairs the UBSC, which is comprised of a minimum of three members of the Kettering community and includes representatives from faculty, staff, and students. The Conduct Officer investigates the charges and prepares the case for presentation to the UBSC. All presentations include resolution options. The UBSC makes recommendations to the Associate Dean of Student Engagement and Success, who may endorse, alter, or dismiss them.

Other Resolution Options

The Associate Dean of Student Engagement and Success may, after consultation with the involved parties, provide other avenues of resolution, including mediation and/or conciliation.

Administrative and University Board of Student Conduct Hearings Decisions

All decisions will be based only on documents, testimony, and evidence presented at administrative and University Board of Student Conduct hearings.

Sanctions

The University has the right to enforce a variety of sanctions upon students who are found to have violated the Code of Student Conduct. They include, but are not limited to, the following:

- **Creation of a Misconduct File**
  The University applies this sanction whenever the Conduct Officer or other hearing officer[s] uphold charges against a student for violating the Kettering Code of Student Conduct, yet it appears that interviews and counseling associated with the pre-hearing and hearing are sufficient to deter further violation. The Conduct Officer creates an official file detailing the student's offense.
- **Misconduct Warning**
  A Misconduct Warning consists of a formal, written notice that the student has violated the Code of Student Conduct and that any future violation will result in more serious consequences.

- **Restitution and/or Fines**
  When a violation of the Code of Student Conduct results in costs to other students, Kettering University, or others, a student may be required to make restitution and/or pay a fine. The University applies fines to community endeavors.
- **Community Service**
  This sanction requires students to contribute a fixed number of hours, without compensation, to benefit the University or the local community. The University retains the right to require that students complete community service with particular organizations it specifies.
- **Misconduct Probation**
  Misconduct probation implies a medial status between good standing at Kettering, and suspension or expulsion. A student on Misconduct Probation will be permitted to remain enrolled at Kettering University under certain stated situational conditions, depending on the nature of the violation and the potential learning value that may be derived from such conditions. Usually, Misconduct Probation extends over a stated period, during which it is clearly understood that the student is subject to further disciplinary action, including suspension or expulsion if the student violates the terms of probation or in any way fails to conduct him/herself as a responsible member of the Kettering University community. Misconduct Probation serves as a final warning to the student to re-evaluate and modify his/her unacceptable behavior. Students on Misconduct Probation will not be allowed to represent the University in any formal manner and may not serve in a student leadership position during the period of probation. Knowledge of a student's Misconduct Probation status may be made known to others at the University on a need-to-know basis.
- **Interim Suspension and/or Altered Privileges**
  Kettering imposes Interim Suspension when it appears the accused poses a threat to him/herself or others at the University. It may also be imposed following allegations of sexual or physical assault, drug use and/or distribution, threats of violence, etc.
  The Associate Dean of Student Engagement and Success or designate may alter or suspend the privileges/rights of a student to be present on campus and/or to attend classes for an interim period prior to the resolution of a conduct proceeding. Decisions of this sort will be based upon whether the allegation of misconduct appears reliable and whether the student's continued presence reasonably poses a threat to the physical or emotional condition and/or well-being of any individual, including the accused student. Interim suspension may also be imposed when the accused student's continued presence appears to disrupt the University's regular or special functions or threaten the safety or welfare of university property.
  Interim Suspension and/or altered privileges remain in effect until a final decision is made on a pending incident. The Associate Dean of Student Engagement and Success or designate may repeal interim suspension or altered privileges at his/her discretion.
- **Suspension**
  Suspension—an involuntary separation of a student from Kettering University—implies and states a time for return to the University. Suspension may extend for a school and/or work term, for a specified period, until a specified date, or until a stated condition is met. A University Board of Student Conduct may recommend suspension, but only the Associate Dean of Student Engagement and Success may impose it. Suspensions are noted on student's official transcripts as "temporary involuntary separation" until all required conditions are met.
- **Expulsion**
  Expulsion—a permanent involuntary separation of a student from Kettering University—may be recommended by a University Board of Student Conduct, but only the Associate Dean of Student Engagement and Success may impose it.
- **Student Conduct Appeals**

  Any student who has been sanctioned through Kettering University Code of Student Conduct processes has the right to appeal to the Vice President and Chief Student Experience Officer. All appeals must be made in writing within five [5] business days of notification of the results of a hearing and must state the grounds upon which the appeal is based. Grounds for appeal might include claims of procedural errors, new information, denial of rights, or inappropriately severe punishment. Should the Vice President and Chief Student Experience Officer choose to grant an appeal, the case will be reviewed, and a written decision will be conveyed to the individual indicating whether the sanction[s] shall stand, be modified, or reversed.

- **Notification of Sanction to Co-Op Employers**
  The University has the right and responsibility to notify a student's co-op employer whenever the student is found to have violated the Kettering Code of Student Conduct.

Students' Use of Technology

The use of any personal computational or communication devices in the classroom, not otherwise governed by the University or course policies, is subject to the approval of the instructor. This includes but is not limited to, the use of calculators, computers, personal digital assistants, and cell phones. Any use of such devices without the instructor's approval is prohibited. The use of such devices without the permission of the instructor may be considered disruptive behavior. Students who persist in such activity may be subject to the University's "Dismissal Due to Disruptive Behavior" policy.

The use of electronic devices to facilitate an act of academic misconduct, such as cheating or plagiarism, will be considered a violation of the Code of Student Conduct and adjudicated following standard Student Conduct policies and procedures.

Students are expected to familiarize themselves with Kettering University's Acceptable Use Policy, posted in the "Policies and Standards" section of the Information Technology website.

Student Computer Requirement

Students are required to have their own laptops and not use a computer at their place of employment due to frequent limitations related to firewalls.

E-mail: Notification/Obligation to Read

All students have the privilege of having a Kettering University Google Apps e-mail account. The Kettering e-mail account is the official way Kettering University faculty and staff communicate with students. Students are responsible for required actions conveyed to them through this communication vehicle, **whether or not they read the message**.

Kettering provides each student with unlimited e-mail server storage. Therefore, we strongly recommend that students do not auto-forward to another e-mail service provider, which may have less storage capacity

and fewer features and may hinder you from replying directly to the original email source.

Due to the proliferation of spam and phishing emails, be advised that you may receive emails requesting personal information such as usernames and passwords. Although it may look authentic, pretending to originate from a legitimate source, such as Kettering, does not respond. Immediately delete it, recognizing that a legitimate source such as the Kettering IT department would never ask you to provide information such as passwords. The IT department has included an Alert message attached to incoming emails if an attachment is received from an outside non-Kettering address. Be cautious regarding any unsolicited email as it may contain elements that would prove to be detrimental to your computer.

Dismissal from Class Due to Disruptive Behavior

Whenever an enrolled student's presence or behavior in class disrupts the learning environment and, in the faculty member's opinion, undermines the best interests of the class and/or the student, the faculty member may request in writing (with a copy to the appropriate Department Head) that the student be issued an administrative dismissal. The faculty member should discuss the student's behavior with the Associate Dean of Student Engagement and Success (ADSES) and/or his designate, who will meet with the faculty member to discuss the alleged incident. The ADSES will also meet with the student to determine possible judicial action after determining whether or not the student's behavior violates the Kettering Code of Student Conduct. The ADSES will either adjudicate the matter or refer it for action by a designated conduct officer and/or the University Board of Student Conduct. If the dismissal occurs by Friday of the seventh week, the student will receive a grade of W (withdrawn). If the dismissal occurs after Friday of the seventh week, the student will receive an F grade.

Questions: Contact Information Technology

Productive Learning Environment

Kettering University expects all students, faculty, and staff to contribute to a productive learning environment by demonstrating behavior that neither interferes with another individual's performance nor creates an intimidating, offensive, or hostile environment. The University will not tolerate harassment or discrimination in any form, regardless of intent and/or the victim's reaction.

Harassment

The University prohibits all sexual harassment and/or offensive conduct on campus and in students' work section communities. Such conduct includes but is not limited to sexual flirtation, touching, verbal or physical advances or propositions, verbal abuse of a sexual nature, graphic or suggestive comments about an individual's dress or body, sexually degrading words to describe an individual, and/or the display of sexually suggestive objects or pictures, including nude photographs. Behavior constitutes sexual harassment when it is unwelcome, and it interferes with the ability of another person to carry out his/her responsibilities, creates a hostile learning or work environment, or its expression implies that acceptance of the behavior is a condition of course registration, course completion, course evaluation, or employment.

If you believe the words or actions of a University employee or student on campus constitutes unwelcome harassment, take the following steps:

- Inform him or her that his/her actions are unwelcome and the harassing behavior must cease.
- Keep a written record of the details, including time, date, what was said, or what occurred.
- Report the discrimination to the Associate Dean of Student Engagement and Success, the Director of Human Resources, other University officials, or via our Non-Academic Grievance Form, available in the Student Experience Office, Academic Services, the Wellness Center, Thompson Hall, and online at the Student Experience website.

If harassment occurs at your work site, you should report it to your supervisor or the appropriate person as directed by your employee handbook, as well as to your Cooperative Education Manager/Educator. Enlist the counsel of a trusted adviser, if necessary, to report sexual harassment wherever and whenever it occurs. The University pledges to investigate promptly all complaints of harassment and to pursue a timely resolution, which the appropriate University officials will communicate to the parties involved. Confidentiality will be maintained to the extent reasonably possible.

Discrimination

Kettering University is committed to a policy of non-discrimination and equal opportunity for all persons regardless of race/ethnicity, color, ancestry, national origin, religion, sex, sexual orientation, age, marital status, height, weight, marital, military or disability status or any other basis protected by federal or state law. Discrimination includes, but is not limited to, the following:

- Preventing any person from using University facilities or services because of that person's race/ethnicity, color, ancestry, national origin, religion, sex, sexual orientation, age, height, weight, and/or marital, military, or disability status.
- Making determinations regarding a person's salary based on race/ethnicity, color, ancestry, national origin, religion, sex, sexual orientation, age, height, weight, and/or marital, military, or disability status.
- Denying a person access to an educational program based on that person's race/ethnicity, color, ancestry, national origin, religion, sex, sexual orientation, age, height, weight, and/or marital, military, or disability status.
- Instigating or allowing an environment that is unwelcoming or hostile based on a person's race/ethnicity, color, ancestry, national origin, religion, sex, sexual orientation, age, height, weight, and/or marital, military, or disability status.
- Denying raises, benefits, promotions, leadership opportunities, or performance evaluations on the basis of a person's race/ethnicity, color, ancestry, national origin, religion, sex, sexual orientation, age, height, weight, and/or marital, military, or disability status.

If discrimination takes place at your work site, you should report it to your supervisor or the appropriate person as directed by your employee handbook, as well as to your Cooperative Education Manager/Educator. Enlist the counsel of a trusted adviser, if necessary, to report discrimination wherever and whenever it occurs. The University pledges to investigate promptly all complaints of discrimination and to pursue a timely resolution, which the appropriate University officials will communicate to the parties involved. We will maintain confidentiality to the extent reasonably possible.

If you believe the words or actions of a University employee or student constitutes discrimination, take the following steps:

- Inform him or her that his/her actions are unwelcome and the discriminating behavior must cease.
- Keep a written record of the details, including time, date, what was said, or what occurred.
- Report the discrimination to the Associate Dean of Student Engagement and Success, the Director of Human Resources, other University officials, or via our Non-Academic Grievance Form, available in the Student Experience Office, Academic Services, the Wellness Center, and Thompson Hall.

Student Complaints & Resolution Processes

Kettering University maintains processes for the good faith review and resolution of student academic and non-academic complaints. The University's student complaint process will encourage informal resolution of alleged violations at the lowest unit level, allow for a formal resolution mechanism if not resolved informally, and provide for appeal to a final decision maker.

Students may bring complaints regarding the University's provision of education, academic services, and non-academic services affecting their role as students, and must be based upon a claimed violation of a University policy, regulation, or established practice.

Student complaints do not include those regarding University employment, disciplinary action under the Code of Student Conduct, grades, or University admission decisions.

Resolution under this policy may include student reinstatement or other corrective action for the benefit of the student, including refunds, but may not award monetary damages or direct disciplinary action against any employee of the University.

This policy does not limit the University's right to change policies, regulations, or practices related to the provision of academic or non-academic services and education.

Institutional Records of Student Complaints

To comply with federal regulations, Kettering University will maintain records of formal, written academic, and non-academic student complaints filed with the Office of the Provost or the Office of Student Experience Student Engagement and Success. The records will include information about the disposition of the complaints, including those referred to external agencies for final resolution. These records will be available to the Higher Learning Commission (HLC) comprehensive evaluation teams for review.

II. DEFINITIONS

Student Academic Complaint: Complaints brought by students regarding the University's provision of education and academic services affecting their role as students. Academic complaints do not include grade disputes and appeals, which are managed under the Grade Appeal Policy.

Non-academic Complaint: Complaints brought by students regarding the University's provision of non-academic services affecting their role as members of the Kettering community. Non-academic complaints may include but are not limited to, student or employee behavior regarding harassment or discrimination, billing disputes, disability accommodation challenges, medical and counseling services, athletics, etc. They do not include parking violation disputes, which are managed under Campus Safety's Parking Appeals Policy.

III. DETAILS/PROCEDURES

Informal Resolution for Student Complaints

The first step of any resolution should be at the lowest unit level, between the parties involved or the parties and an appropriate third party (e.g., other faculty, department head, director of graduate studies, administrator). If no informal resolution is reached at the lowest unit level, a student may seek an informal resolution at the next level with the other party and higher-level administrators. If the issue is not resolved informally, the student may seek a formal resolution.

Formal Resolution for Student Complaints

If still unresolved after following the appropriate informal complaint process, a student may choose to officially document the complaint to seek formal resolution. Students may file complaints regarding academic matters, excluding grade appeals, with the Office of the Provost. Non-academic complaints, excluding parking citations, should be filed with the Associate Dean of Student Engagement and Success. Students should consult with the pertinent office to prepare a formal complaint; both offices follow these general procedures:

- Students must submit, in writing, an explanation of the concern or appeal, including a full description of the matter, a description of the efforts that have been made to resolve the issue informally, and a statement of requested remedy. Submissions must include accurate contact information. Copies of pertinent materials should be attached.

- A student must begin the informal resolution process during the term in which the concern arises and must register, if applicable, an officially documented complaint no later than thirty days after the first day of classes of the term immediately following the term during which the concern arose.

- If the grievance contains confidential medical information, the University will maintain the confidentiality of that information and will not release it without the student's consent, except as allowed by law.

- Academic complaints should be submitted to the Office of the Provost. Non-academic complaints should be submitted to the Associate Dean of Student Engagement and Success. Upon receipt, the institutional officer will review the complaint for timeliness and appropriateness under this complaint procedure, notify the student if the complaint is accepted for further investigation, and provide a copy of the complaint to the individual against whom it has been made.

- The institutional officer will complete or designate someone to complete an investigation of the matter. The investigator may interview, consult with, and/or request a written response to the issue[s] raised in the complaint from any individual the investigator believes to have relevant information, including faculty, staff, and students. All parties will have the opportunity to provide the investigator with information or evidence that s/he believes is relevant to the complaint. The investigator will respect the privacy of all parties to the extent possible.

- The University will inform the student and the party against whom the student has filed a complaint that the institution will not tolerate real or implied retaliation, will take steps to prevent retaliation, and will

take appropriate responsive action[s], up to and including termination of employment, if an employee is found to have retaliated. Students will be held accountable for retaliation through the Code of Student Conduct and related disciplinary procedures. Individuals should immediately notify the appropriate institutional officer should retaliation occur.

- If a non-academic complaint involves a faculty member, the Associate Dean of Student Engagement and Success will inform the Provost of the complaint, the determination by the investigator, and any appeal. Academic and non-academic complaints that involve a faculty and/or staff member will be reported to the Director of Human Resources.

- All investigations will be completed within thirty [30] working days of the filing of the written complaint. The deadline may be extended by the Provost or Associate Dean of Student Engagement and Success for good cause. At the request of the complainant, the institutional officer may determine if the formal process can and should be expedited.

- The institutional officer will prepare a written report, including findings and a final resolution of the matter. The officer will submit the report within 30 calendar days of receipt of the formal complaint unless there are compelling reasons for delay. The institutional officer will send the report to all interested parties. If the complaint challenges an action personally engaged in by the institutional officer, the Provost will appoint another administrator to fulfill the officer's role under this procedure.

- Decisions made by institutional officers are final and may not be appealed.

Other Complaints

Currently, enrolled students who have a complaint or issue should first try to work out the problem informally by discussing it in an honest and constructive manner with those persons most involved with the issue. Many complaints can be resolved when a student makes an effort to honestly communicate his/her frustrations or concerns. If a student has a complaint related to a specific course he or she is enrolled in, he/she should first consult with the instructor of the course. If necessary, the student or instructor may consult with the academic department head responsible for the course for guidance on how to best resolve the student's concern.

For any complaints that the student cannot resolve informally with the parties involved, the student should contact either the Associate Dean of Student Engagement and Success (for non-academic-related issues) or the Provost (for academic-related issues).

Questions: Contact the Student Experience Office for non-academic issues or the Office of the Provost for academic-related issues

Undergraduate Course of Study

BS/Master Pathway

This option is available to Kettering University undergraduate students entering any Kettering University graduate program, either residential or online.

Kettering University undergraduate students interested in graduate study may elect to apply to the BS/ Master Pathway, which provides students with an opportunity to complete a baccalaureate degree while earning credit towards a graduate degree. This program is exclusively available to Kettering University undergraduate students and leverages the University's premier academic programs. Students admitted to the BS/Master Pathway will complete the same total number of Co-op work terms as conventional undergraduate students.

- Students can apply before graduating (after completing 90 undergraduate credit hours) or within four (4) years of obtaining their baccalaureate degree.
- The student completes the baccalaureate degree, with the traditional undergraduate thesis (BS), and receives the degree at the conventional time.
- Up to sixteen (16) credits or four courses, of *400 or 600 level credit, completed as an undergraduate, and for which a grade of B or better was earned, are also applied to the graduate degree. (Undergraduate capstone courses are not eligible.) (*400 level courses must be part of an approved 400/600-course offering.)
- Twenty-four (24) graduate credits remain to meet the graduation requirement of 40 graduate credits for a degree (Master of Engineering students will need to complete six additional graduate courses to complete the graduation requirement).

Grade Requirements for Admission to BS/Master Pathway

A minimum GPA of 3.0 is required. Students with a GPA below 3.0 may be considered on an individual basis. The degree granting department will determine acceptance.

Other Requirements

- Both part-time and full-time students may qualify for this program.
- This program is only available to students who will receive (or have received) a Kettering University bachelor's degree.

For more information, please contact the Graduate School at gsr@kettering.edu.

Concentrations

A concentration is a specialized area of study within a major area of study. A concentration requires a minimum of two classes (eight credits) in a directed area of study. Concentrations appear on a student's transcript at student declaration, and requirements must be completed at the time of graduation. A concentration is not required for all majors for graduation.

A student wishing to declare a concentration should consult an advisor. The student is responsible for informing the department of the selected concentration and requesting the concentration by emailing the Registrar's Office.

Questions: Contact the degree/program department

Cooperative and Experiential Education

Refer to this catalog's Cooperative and Experiential Education section for related policies and procedures.

Questions: Contact the Cooperative and Experiential Education department

Independent/Directed Study

In order to increase the scope and flexibility of course offerings, many departments offer courses under the designation of Independent or Directed Study. A student who desires a course not normally offered or not available during a given term should approach the instructor in whose discipline the course would normally fall to discuss the possibility of an Independent or Directed Study. If the instructor agrees, a written proposal may be required from the student, specifying the reading and/or research to be undertaken, reports or tests to be used for grading purposes, number of meetings per week, number of credits to be awarded, etc.

Independent Study

An independent study is a unique topic in a specific area of study not offered in an existing course. Requirements and meeting times are arranged by the instructor and student. A student must request and receive approval for an independent study through the instructional department. This is done by completing an Independent Study Form stating the independent study name and description, and obtaining all required signatures. The completed form must be submitted to the Office of the Registrar no later than the last day of the drop/add period specified on the published academic calendar.

Directed Study

A directed study is a course listed in the undergraduate catalog but not scheduled during a given term. It is done on a one-on-one basis with an instructor for that course. A student must request and receive approval for a directed study through the instructional department. If approved, the department will notify the Registrar's Office to create the course no later than the last day of the drop/add period specified on the published academic calendar.

Questions: Contact the department offering the course

Majors (Declaring/Changing)

A student wishing to declare, change, or add a major should consult an advisor. The student is then responsible for communicating this change to the Office of the Registrar. The Registrar will update the student record.

Double Majors

Students may earn a double major as part of a single bachelor's degree by completing all course requirements for the two majors. If capstone courses are required in both majors, both must be completed. Only one thesis is required. To pursue a double major, obtain approval from the departments for both majors. Both majors will be shown on the transcript.

Questions: Contact the Office of the Registrar

Minors (Declaring/Removing)

A minor is an area of concentrated study outside of the major area of study. A minor requires a minimum of four classes (16 credits) in a directed area of study. Minors may require coursework beyond the minimum 141-161 credits required for completion of the major. Minors are not required for graduation, though a student may elect to pursue a minor in an area of additional interest. Minors appear on a student's transcript at student declaration, and requirements must be completed at the time of graduation. Refer to the "Minors" section of this catalog for a complete list of minors and their requirements.

A student wishing to declare, change, or add a minor should consult an advisor. **Minors must be added to the student's record prior to taking the courses within the minor.** The student is then responsible for communicating this change to the Office of the Registrar. The Registrar will update the student record.

Questions: Contact the Office of the Registrar

Second Baccalaureate

Students can earn a second bachelor's degree after graduating. The student must complete all the degree requirements, with a minimum of 28 credits required in earning the second degree, along with a minimum of three coop terms and a thesis. The department offering the major sought for the second bachelor's degree must evaluate the student's transcript to determine which courses are required.

Questions: Contact the degree/program department head

Study Abroad

Refer to the International Programs section of this catalog.

Questions: Contact the Office of International Programs

Undergraduate Credits

Classification

Kettering University designates the classification of students, regardless of the degree program being pursued, according to the total earned hours accumulated.

Classification	Code	Earned Hours
Freshman	FRI	0-11
Freshman	FRII	12-23
Sophomore	SOI	24-39
Sophomore	SOII	40-55
Junior	JRI	56-71
Junior	JRII	72-87
Senior	SRI	88-103
Senior	SRII	104-119
Senior	SRIII	120 and above

Note: Major classification (Freshman, Sophomore, etc.) is subdivided into the classification code (FRI, FRII, SOI, SOII, etc.) for internal tracking of progress and estimation of the expected graduation date.

Questions: Contact the Office of the Registrar

Transfer Credits

New Transfer Students

Students transferring to Kettering University may receive earned hours for a Kettering course for which they have taken an equivalent course (in content and level) at their previous institution.

The following conditions apply:

- Transfer credit is accepted only from accredited colleges and universities.
- Upon receipt of transfer credit information from the Admissions Office, coursework will be evaluated for transferability to Kettering University, along with applicability to the student's degree requirements.
- Only courses in which a C (2.0 on a 4.0 grade scale) or higher was earned will be evaluated for transfer credit.
- Only the credit will transfer; the grades do not transfer and will not affect the GPA.
- A maximum of 80 earned hours in a 161-credit program may be awarded by transfer upon admission.
- A maximum of 68 earned hours in a 141-credit program may be awarded by transfer upon admission.
- A maximum of 56 earned hours in a 115-credit program may be awarded by transfer upon admission.
- Any requests for transfer coursework review must be submitted along with any requested supporting documentation by the end of the student's first academic term.
- Final official transcripts are required to be mailed or received electronically from the student's transferring institution(s) prior to registration for the next academic term.
- Transfer evaluations are processed by the Registrar's Office (registrar@kettering.edu).

Current Students

Students enrolled in a Kettering University degree program may take selected coursework at other institutions if the need arises and the opportunity is available. Such transfer credits are called "guest credit." Students who want to take a course at another institution and transfer the credits to Kettering University must have the course approved *prior* to registration at the other institution.

The following conditions apply:

- Guest transfer credit is accepted only from accredited colleges and universities.
- A Guest Application Form must be completed by the student and submitted to the Office of the Registrar for approval. **Note:** Even if a course is listed on the Course Equivalency System, it does not guarantee approval. Official approval is obtained by completing the Guest Application and receiving all required signatures of approval. The Office of the Registrar will send an email to the student's Kettering email account confirming approval or non-approval.
- Students should consult with their advisor to confirm the course being taken as guest credit will apply towards their degree requirements before registering for the course.
- A maximum of 16 guest transfer credits are allowed while a student is in active status.
- The course must carry a grade of C (2.0) or above to transfer. Grades of C- or below are not transferable.
- Only the credit will transfer. The grades do not transfer and will not affect the GPA. Therefore, the grades cannot replace grades earned at Kettering University. This means credit for a guest course can earn credit for a failed Kettering course but the Kettering course grade will remain on the student transcript and in the GPA.
- The course repeat policy only affects courses repeated at Kettering University. Guest credits do not qualify under this policy.
- Courses approved for guest credit do not eliminate pre-requisite requirements.
- Independent Study work is not transferable.

Free Elective Transfer Credits

Courses taken outside of Kettering University that do not correspond to an existing Kettering University discipline may be transferred as FREE-297 or FREE-497.

The following conditions apply:

- A course is eligible under this policy if the course is from an institution with U.S. regional accreditation.
- A course from an institution outside the U.S. will be considered for FREE-297/FREE-497 if the course is from an institution which has been approved for transfer of courses with Kettering University equivalents.
- The course must be considered non-remedial at both Kettering University and the transfer institution.
- Courses at the 100 or 200 level at the transfer institution will be transferred as FREE-297.
- Courses at the 300 or 400 level at the transfer institution will be transferred as FREE-497.
- A minimum of 2400 classroom minutes in one or more courses is required for four credits of FREE-297/FREE-497. A number of credits different from four is not allowed.

- A student should receive academic advising from their degree department before initiating the process of transferring FREE-297/FREE-497.
- The number of credits of FREE-297/FREE-497 shall be limited to the number of Free Electives in the student's degree program that have not already been fulfilled through other transfer or Kettering courses.
- Current Kettering students may apply for FREE-297/FREE-497 credit through the normal Application for Guest Credit process.

Questions: Contact the Office of the Registrar

Proficiency Credit by Examination

Students may petition the Head of the department responsible for a given course to receive earned hours by examination. If the Department Head deems it appropriate and acceptable, the student will be given the means to demonstrate knowledge and performance of the course material at a level no less than that of an average student enrolled in the course. The individual departments set specific performance expectations for proficiency exams. If such demonstration is successful, the course credit hours are awarded to the student as earned hours by examination and will be indicated on the student's transcript. A student may not use the proficiency credit by examination option for a course already attempted or if currently registered for the course. Students may attempt to earn credit by proficiency in a specific course only once, regardless of whether the examination is passed or failed.

Questions: Contact the degree/program department head for the course

Undergraduate Enrollment

Attendance

Student Responsibilities

Prompt and regular attendance is expected of students for all scheduled courses and laboratory work. Student participation in class discussion, question/answer sessions, and problem-solving is critical to the expected student learning outcomes. Faculty may include explicit attendance requirements and applicable grade penalties in their course syllabi. Students are expected to be aware of such requirements if they exist. Most faculty require documentation for course absences. Students are responsible for providing such documentation if they wish to have their absences excused. Only faculty may excuse an absence.

Students who stop attending courses before the course withdrawal deadline specified on the academic calendar should immediately withdraw from those courses. Students who do not officially withdraw from the course they are not attending may be reported to the Registrar by their instructor with the last date of attendance. When this happens, the student will remain responsible for any financial liability, less applicable refunds they have incurred associated with the last date of attendance reported, and for any academic consequences related to the last date of attendance reported and the assignment of the WN or FN grade. Once a faculty member has reported a last date of attendance, the student can no longer attend or participate in the class.

Consequences of Non-Attendance

Students who do not attend classes may be issued the following grades:

- A grade of WN (withdrawal for non-attendance) is issued if the last known date of attendance is within the course withdrawal period specified on the academic calendar. A WN grade is treated the same as a W (withdrawal) grade in that it does not affect a student's term or overall GPA.
- A grade of FN (failure for non-attendance) is issued if the last known date of attendance is after the course withdrawal period specified on the academic calendar. An FN grade is treated the same as a failing grade in that it is included in the students' term and overall GPA.

The grade change resulting from non-attendance can be initiated by faculty based on their individual course attendance policy. It may also result from the university's Last Known Date of Attendance Reporting Policy. This policy is required by the U.S. Department of Education to differentiate between students who fail a class for non-attendance and those who fail based on merit. This information is used for determining financial aid liability and eligibility. The assumption is that a grade of F demonstrates failure based on merit, while FN demonstrates failure resulting from non-attendance.

Questions: Contact the Office of the Registrar

Class Attendance Policy Related to Required Military Duty or Veteran Status

Questions on whether an activity is a required military service activity for purposes of this policy should be directed to the Associate Provost. If anticipated absences for a term appear to be extraordinarily numerous or difficult to accommodate, a faculty member may appeal the need for the full accommodation to the Associate Provost.

Absences due to military duty or veteran status must be excused. This includes, but is not limited to, the following:

- Mandatory monthly drill instruction, such as duty completed by national guard members and military reservists (typically this involves a one-day absence in order to extend weekend training).
- Service-related medical appointments where failure to appear might result in a loss of benefits.

Students must give written notice to the faculty member at least one week in advance of the absence unless last-minute schedule changes make this notice impossible. Students are strongly encouraged to inform each faculty member of their known and anticipated absences as far in advance as possible, preferably at the start of the term.

The faculty shall accord students the opportunity to independently make up coursework or work of equal value, for the day(s) the event was scheduled and to take a scheduled exam at an alternate time. The faculty member shall determine alternate exam times and due dates for missed course work. These assigned dates may be prior to the date of the absence.

Students are still responsible for demonstrating achievement of course learning goals, even when absences due to military duty are necessary and reasonable. In situations with many absences or extended periods of military duty (e.g. being called to active duty), it may be most appropriate for the student to withdraw and retake the course in a future term.

Enrollment

Impact of Non-enrollment

Students must have a registration in each term for course work, co-op, or the culminating undergraduate experience (CUE) in order to remain in active status. When circumstances occur where this may not be possible, students may take a Leave of Absence (LOA) or withdraw from a term or the University until the next academic term in which they could be enrolled. (Refer to the "Leave of Absence" and "Withdrawals" sections below for more information.)

Students with no registrations who do not formally withdraw or take a leave of absence will automatically become inactive (separated) due to non-enrollment. Inactive students may apply for readmission by submitting an Application for Readmission Form to the Office of the Registrar. Students' cooperative employers are not obligated to continue their agreement with the student if the student status becomes inactive. Students in an inactive status will no longer have access to any campus buildings, the Recreation Center, Kettering email or Banner Self-Service. Inactive students are not eligible to participate in commencement.

Questions: Contact the Office of the Registrar

Sections

Kettering students follow one of the two rotations of academic and co-op terms (A or B section). The **A-section students** attend classes in the summer and winter, while **B-section students** attend classes in the fall and spring. Students complete work terms on the off-school terms. Any changes to this school/work sequence must be approved **in advance** by following the Altering the Academic/Work Sequence Process. Students may not adjust their sequence without an approval. This ensures that all relevant university offices are aware of the changes in the students' plans. As such, arrangements made between students and employers without university approval will result in no co-op credit granted for the term. Students should consult with the Financial Aid Office for information on how altering the academic/work sequence may affect financial aid.

Questions: Contact the Academic Success Center

Status

Students may have the following undergraduate enrollment statuses:

Full time: 15 or more credits or co-op or Culminating Undergraduate Experience (thesis)
Three Quarter Time: 12-14 credits
Half Time: 8-11 credits
Less Than Half Time: 1-7 credits

Enrollment verifications for medical insurance, loan deferments, employment, or other needs may be obtained through the Office of the Registrar. Enrollment verifications confirm a student's enrollment status (full-time, three-quarter time, half-time and less than half-time) and expected graduation date.

Leave of Absence

The Undergraduate Student Leave of Absence (LOA) Policy assists and encourages students to return and complete their degree after up to two consecutive terms of absence from Kettering University. Eligible students are encouraged to take advantage of the benefits provided by an LOA, e.g., no need to apply for readmission and ability to participate in their regularly scheduled registration/enrollment period upon return to the University. Refer to the Leave of Absence Request Form for more information and instructions.

Questions: Contact the Office of the Registrar

Registration

Course Load

The representative program of courses shown term-by-term for each of the degrees offered indicates what is considered a normal course load. In general, those loads are four courses per term for underclassmen amounting to approximately 16 attempted hours, and five per term for upperclassmen, amounting to 20 attempted hours. Refer to the Tuition and Fees section of this catalog for tuition rates/credit hours.

Course Overload

Students are eligible to request one additional course beyond the limits if they meet the following criteria:

- Their cumulative GPA is 3.5 or higher, and
- They have completed a minimum of 16 credit hours with no course withdrawals or failures in both the current term and previous academic term, and
- They are not currently enrolled in college mathematics (MATH 100).

Students wishing to take overloads beyond the standards above will need to request approval by submitting a request outlined in the Request for Overload Procedure. Only students in good academic standing are allowed to attempt an overload. Students whose performance is less-than-good standing may be required to take a course load less than that represented for their degree program. These students should contact the Academic Success Center (Room 3-322 AB).

New Student registration

New undergraduate students (freshmen and transfer) are registered for their first academic term by the Academic Success Center (ASC) after they sign up for their SOAR (Student Orientation and Academic Registration) session, complete the pre-registration form, and once all relevant information (math placement score, AP scores, transfer credits) has been gathered. While registration will be completed as early as possible, schedules are not considered final until the orientation/ move-in weekend to allow for unavoidable scheduling adjustments. All new students will participate in SOAR prior to the start of the term. They will sign up for a SOAR session through their New Student Portal where they can also find access to the math placement and pre-registration form.

All new students must take a math placement exam in order to have their schedule built unless they meet one of the following criteria:

- Students earned an ACT Math score of 31 or higher
- Student earned an SAT Math score of 690 or higher
- Student has college transfer credit for calculus
- Students has Advanced Placement credit for calculus.

Continuing Student registration

Registration for the next academic term takes place each term, beginning in the seventh week. The registration time period is based on the students' current class standing and does not count current registrations or class rank. Students in each class standing will have a 24-hour window of opportunity to register for classes before the students with the next standing are allowed to register.

All students require a PIN to access registration. Requirements for registration should be clarified with the students' advisors. Students may receive academic advising within the Academic Success Center (ME and undeclared majors) or within the degree department. Students with dual majors should be advised by both degree departments.

Course Registration during Co-op or with Thesis

All students are automatically registered in their cooperative work experience and thesis terms. Students are allowed to register for a maximum of eight credits of coursework while registered for a co-op or thesis term. To register for coursework during a co-op term, students must complete the Course Selection During Co-op Term Form and submit it to the Registrar's Office.

Drop/Add

Students may drop and add courses before the drop/add deadline noted on the published academic calendar. Any student who does not appear on the final roster by the conclusion of the drop/add period will not receive credit for the course.

Repeating a Course

Students may repeat any course taken at Kettering University as long as it is still offered; however, several conditions apply.

Students may repeat a course only two times (for a total of three attempts). Withdrawals are included in the number of repeat attempts; however, the first "W" grade will be forgiven.

ANY repeats for the following courses require the approval of the Academic Success Center, which will be provided only after a one-on-one conversation with an advisor.

MATH-101, 101X, 102, 102X, 203, 203X
PHYS-114, 115, 224, 225
CS-101
CHME-200
CILE-101
LA-489

For all other courses, any repeats beyond one require the approval of the Academic Success Center, which will be provided only after a one-on-one conversation with an advisor.

After the second retake (third attempt), students must transfer the course from another institution.

A student on their third and final attempt for a course will be limited to 16 or fewer credits that term.

All grades will appear on the student record and transcript. The highest grade received is used in computing the term and cumulative GPA values; the lower grade(s) will be excluded from the term and cumulative GPA values. The recalculation of GPAs to account for repeated courses occurs at the end of the term after all grades for all students have been processed. Courses repeated at another institution and transferred to Kettering will not replace any attempts at Kettering. Hours earned in repeated courses may be counted toward graduation only once. Once a degree has been awarded, students cannot repeat a course and have the new grade count towards that degree.

Questions: Contact the Office of the Registrar

Terms and Semesters

- **Academic term** - an eleven-week period of instruction and evaluation.
- **Cooperative work experience term** - a twelve-week period of supervised employment at an authorized Kettering University corporate affiliate; no credit, quality points, or hours are earned through the work experience.
- **Semester** - a combination of one academic term and one cooperative work experience term for a total of twenty-three weeks.
- **Academic year** - a period of two semesters for a total of forty-six weeks.

Undergraduates Taking Graduate Courses

Students taking 500+ level courses are not automatically admissible to the graduate program. They still have to meet all published admissions requirements. **Note:** Courses taken for undergraduate credit at Kettering University may not be repeated at the graduate level and count towards the graduate program. Furthermore, 500-level courses taken at Kettering University for undergraduate credit may not count as graduate credit except as approved per the BS/MS and BS/MBA policy guidelines.

Undergraduates Taking Graduate Courses for Undergraduate Credit

Students enrolled in an undergraduate degree program at Kettering University may request registration in a Kettering graduate-level course (500+ level) for undergraduate credit. To do this, students must:

- Complete and receive instructional department and degree department approvals on the Undergraduate Request to take Graduate Course Form and submit form to Registrar's Office for proper registration.

Undergraduates Taking Graduate Courses for Graduate Credit

Students enrolled in an undergraduate program at Kettering University may request registration in a Kettering graduate-level course (500+ level) for graduate credit. Undergraduate students may take up to three graduate courses for graduate credit while an undergraduate student (no more than two per term).

Students are eligible to take a Kettering graduate-level course (500 or above level) for graduate credit if they meet all of the following criteria:

- They are enrolled in an undergraduate program at Kettering University.
- They are in good academic standing.
- They have a minimum of 120 earned credits.
- They are enrolled in no more than 20 credits, unless qualified to take 24 credits.

In order to receive graduate-level credit, students must do the following:

- Complete and receive instructional department and degree department approvals on the Undergraduate Request to take Graduate Course Form and submit the form to the Registrar's Office for proper registration.
- The student must earn a grade of "B" or better in the course.

Questions: Contact the Office of the Registrar

Withdrawals

Course Withdrawal

When a student feels that completing a course is not possible or in the student's best interest, the student may withdraw from the course and receive a non-punitive grade of W (withdrawn). The following conditions apply:

- Withdrawals are allowed during the course withdrawal period specified on the academic calendar. After that period, the student is not permitted to withdraw from the course and is committed to receiving a Kettering letter grade, which may include a grade of FN (failure for non-attendance). Retroactive withdrawals are not allowed.
- Withdrawals are included in the number of repeat attempts.
- Refer to the Tuition and Financial Aid sections of this catalog for the refund rate schedule and how withdrawing from a course may affect financial aid.

Medical/Compassionate Withdrawal (After 8th Week)

In extraordinary cases, a medical or compassionate withdrawal request may be made after the eighth week of the academic term when the final drop date has passed. These cases are severe illness or injury (medical) or a significant personal situation (compassionate) preventing a student from continuing their classes, and where incompletes or other arrangements with the instructors are not possible.

The withdrawal request is typically a complete term withdrawal, but each case will be reviewed individually. All applications for withdrawal require credible documentation submitted to the Wellness Center at wellness@kettering.edu as well as a personal statement outlining the reasoning for the request, which course(s) the student is requesting to withdraw from, and why only a partial withdrawal is needed when applicable. Withdrawal requests are reviewed by the Student Emergency Response Committee, which will collectively review all documentation and determine the most appropriate decision based on individual circumstances. Please note that not all requests are approved.

No refunds apply to the approved medical or compassionate withdrawals. Requests for this type of withdrawal must occur during the term in which the hardship occurs. Withdrawal requests are due before final grades have been posted for that term. Please check the academic calendar to determine the applicable date.

For more detailed information regarding the process to submit a withdrawal request, please refer to the Wellness Center's webpage on Medical/Compassionate Withdrawals.

Military Call to Active Duty Withdrawal

Students may withdraw from the University and receive a 100% tuition refund upon presenting original Armed Forces orders to the Registrar. Non-punitive grades of W will be issued. Should the call come during or after the eighth week of the term, an incomplete may be given (with the approval of the instructor) with no reimbursement of tuition. A written agreement must be developed between the instructor and the student to clarify a plan for completion of the course. The student initiates this agreement by completing an Incomplete Grade Agreement form after the incomplete grade has been issued by the instructor. This form will be filed in the Office of the Registrar an official documentation of this agreement.

Term Withdrawal

Withdrawing from all courses in a term requires students to contact the Academic Success Center.

University Withdrawal

Withdrawing from the University requires a completed Undergraduate Withdrawal from University Form. Complete instructions and information are included on the form.

FERPA (The Family Educational Rights and Privacy Act)

The Family Educational Rights and Privacy Act (commonly referred to as “FERPA” or the “Buckley Amendment”), helps protect the privacy of student records. The Act provides for the right to inspect and review education records, the right to seek to amend those records and to limit disclosure of information from the records. The Act applies to all institutions that are the recipients of federal funding.

In accordance with FERPA, Kettering University has policies and procedures in place to protect the privacy of education records. Students will be notified of their FERPA rights annually by publication in the Undergraduate and Graduate Catalogs and by an annual email message to students at the beginning of the academic year.

Disclosure of Education Records

Kettering University will disclose information from a student's education record only with the written consent of the student, except:

1. To school officials who have a legitimate educational interest in the records.
   A school official is:
   - A person employed by the university in an administrative, supervisory, academic, research, or support staff position (including Campus Safety and Wellness Center staff);
   - A person elected to the Board of Trustees;
   - A student serving on an official committee, such as disciplinary or grievance committee, or assisting another school official in performing his or her task;
   - A volunteer or person employed by or under contract to the university to perform a special task, such as legal counsel or an auditor;
   - Agencies conducting business on behalf of Kettering University (i.e. National Student Clearinghouse, officials of the U.S. Department of Education and state and local educational authorities, accrediting organizations and banks).

   Educational Need to Know:
   A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibilities for Kettering University.
2. To officials of another school, upon request, in which a student seeks or intends to enroll.
3. In connection with a student's request for or receipt of financial aid, as necessary to determine the eligibility, amount, or conditions of the financial aid, or to enforce the terms and conditions of the aid.
4. To organizations conducting certain studies for or on behalf of the university.
5. To comply with a judicial order or a lawfully issued subpoena.
6. To appropriate parties in a health or safety emergency.
7. When the request is for directory information (see below).

Directory Information

Institutions may disclose information on a student without violating FERPA through what is known as "directory information." Kettering University designates the following categories of student information as public or "Directory Information." Such information may be disclosed by the institution at its discretion.

- Corporate affiliation
- Degrees awarded, including dates (actual and expected)
- Dates of attendance
- Degree program (major field of study, concentrations and minors)
- Degrees and honors awarded (including Dean’s List)
- Enrollment Status (including full or part-time)
- Honor Societies
- Photo
- Previous institutions attended
- Class standing (freshman, sophomore, junior, senior, graduate student)
- Name, address and phone number
- E-mail address

Solomon Amendment

Federal law requires that all institutions of higher learning provide directory information to the military upon request, including student name, address, telephone number, age or year of birth, academic major and level of education (e.g. freshman, sophomore, etc. or degree awarded). Where there is a conflict between the Family Educational Rights and Privacy Act of 1974 (FERPA), the Solomon Amendment would supersede FERPA.

Annual Notification to Students of Rights Under FERPA

FERPA affords students certain rights with respect to their education records. They include:

1. **Inspect and Review of Records**
   The right to inspect and review the student’s education records within 45 days after the day the University receives a request for access. A student should submit to the registrar, dean, head of the academic department, or other appropriate official, a written request that identifies the record(s) the student wishes to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.
2. **Amendment of Records**
   The right to request the amendment of the student's education records that the student believes are inaccurate, misleading, or otherwise violate the student's privacy rights under FERPA. Students should write the University official responsible for the record, clearly identify the part of the record they want changed, and specify why it should be changed. If the University decides not to amend the record as requested, the University will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.
3. **Consent to Disclosure**
   The right to provide written consent before the university discloses personally identifiable information from the student’s education records, except to the extent that FERPA authorizes disclosure without consent.
   The school discloses education records without a student’s prior written consent under the FERPA exception for disclosure to school

officials with legitimate educational interests. A school official is a person employed by Kettering University in an administrative, supervisory, academic, research, or support staff position (including Campus Safety and Wellness Center staff); a person serving on the board of trustees; a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her task; a volunteer or person employed by or under contract to the university to perform a special task, such as legal counsel or an auditor; agencies conducting business on behalf of Kettering University (i.e. National Student Clearinghouse, accrediting organizations and banks).
A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibilities for Kettering University.

4. **FERPA Complaints**
The right to file a complaint with the U.S. Department of Education concerning alleged failures by Kettering University to comply with the requirements of FERPA. The name and address of the Office that administers FERPA is:
Family Policy Compliance Office
U.S. Department of Education
400 Maryland Avenue, SW.
Washington, DC, 20202

For more information on the Family Educational Rights and Privacy Act, visit the Office of the Registrar Website, under FERPA.

Grades

Grades

Students may view and print their term grades through Banner Self Service, accessed with their Email/LDAP user name and password. Unofficial transcripts are also available on Banner Web.

Grade	Description	Points
A A-	These grades are awarded to students whose level of performance in meeting the requirements of the course is outstanding. These students understand the concepts and the principles of the course and are able to apply them creatively to unfamiliar situations, use correct methods accurately in problem solving, and communicate their findings to others effectively.	4.0 3.7
B+ B B-	These grades are awarded to students whose level of performance in meeting the requirements of the course is definitely better than average. These students have a good understanding of most or all of the concepts and principles, generally use correct methods, and are usually accurate in their thinking. They do a good, though not superior, job in communicating within the context of the course.	3.3 3.0 2.7
C+ C C-	These grades are awarded to students whose level of performance is adequate. These students meet the essential requirements of the course and have a basic understanding of course concepts and principles, but have some difficulty applying them correctly. They do a fair job of communicating their ideas.	2.3 2.0 1.7
D+ D	These grades are awarded to students whose level of performance in general is poor but not failing. These students meet minimum course requirements but lack adequate understanding of some concepts and principles and make rather frequent mistakes in applying them. They do a poor job of communicating ideas relating to the course.	1.3 1.0
F	This grade is issued to students whose level of performance fails to meet even the minimum requirements of the course. These students fail to grasp most of the essential concepts and principles and make frequent mistakes in applying them. Their performance is definitely unsatisfactory.	0.0
FN	A student is issued a grade of FN (failure for non-attendance) if they stopped attending and the last known date of attendance is after the course withdrawal period specified on the academic calendar.	0.0
AU	A student is issued the non-punitive grade of Audit (AU) upon submission of "Request to Audit" form during the registration or the add/drop period specified in the academic calendar.	0.0
I	A student is issued an Incomplete (I) at the request of the faculty when circumstances outside of the student's control do not allow completion in the normal time period.	0.0

S	A student is issued a grade of Satisfactory (S) upon receipt of a satisfactory employer/student evaluation.	0.0
U	A student is issued a grade of Unsatisfactory (U) upon receipt of a unsatisfactory employer/student evaluation.	0.0
W	A student is issued a non-punitive grade of (W) whenever withdrawing from a course during the course withdrawal period specified on the academic calendar.	0.0
WN	A student is issued a grade of WN (withdrawal for non-attendance) if they stopped attending and the last known date of attendance is during the course withdrawal period specified on the academic calendar.	0.0
P, PD, F, EX, NR	The thesis project is awarded the grade of Pass (P), Pass with Distinction (PD), Fail (F), Extension (EX), or Not Required (NR)	0.0
NR	Beginning July, 2018, this grade for CILE-400 will indicate Not Recorded.	0.0

Course Hours and Points Definitions

Quality Points = Grade x Credit Hours
GPA = Quality Points ÷ GPA Hours

Attempted hours (AHRS) - the sum of the course credit hours for which a student has registered. Attempted hours per term is the basis for determining tuition charges and the student load.

Earned hours (EHRS) - work equivalent to that defined for a University credit hour which the student has successfully completed at Kettering University, at another institution, or by examination. Not all earned hours necessarily apply to the specific degree program being pursued by the student.

Grade Point Average (GPA) - computed for each term individually and cumulatively. In either case, the weighted GPA is computed by dividing the total quality points earned by the total quality hours accumulated.

GPA hours (GPA-HRS) - credit-hour value of the course that is awarded only for course work taken at Kettering University. Only course work resulting in GPA hours is used in computing a student's grade point average (GPA).

Quality Points (QPTS) - computational value used to compute a student's grade point average (GPA). The quality points earned for a given course are equal to the credit hour value of the course multiplied by the numerical equivalent of the letter grade.

Questions: Contact the Office of the Registrar

Credit Hour Policy

Kettering University defines a credit hour as one 60-minute class period per week. The University assigns four [4] credits to all courses in all undergraduate and graduate degree programs: on-ground and Kettering University Online [KUO]. Undergraduates and onground graduate students are expected to spend at least two hours outside of class preparing for each hour in class. A 4-credit course requires these students to devote 120 hours of effort per term, or approximately three [3] hours of effort per week, for 10 weeks, for each registered credit hour.

Kettering University online graduate courses, which may follow either a 6-week or 8-week schedule, require the same total amount of effort, i.e., 6-week courses require 20 hours of student work per week; 8-week courses require 15 hours per week, for a total effort of 120 hours. Kettering University online courses require a considerable amount of class time in the form of discussion board activities, synchronous webinars, or other online interactions, including individual interactions with professors. Preparation, research, viewing of media, and assignment completion require additional time.

These credit hour requirements fulfill federal definitions and regulations regarding the assignment of credit hours as follows under Section 600.2 and 600.24(f) of the Higher Education Opportunity Act:

Credit hour. Except as provided in 34 CFR 668.8(k) and (l), a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates not less than ---

1. One hour of classroom or direct faculty instruction and a minimum of two hours of out of class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or

2. At least an equivalent amount of work as required in paragraph (1) of this definition for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

Grade Appeal Process

The course instructor has the authority and obligation to assign appropriate grades in any course. Questions concerning an assigned final grade are to be handled through the grade appeal process. Final course grades may be appealed only if the student can demonstrate that the grading policy applied to his/her grade does not conform to the stated grading policy of the course instructor. The absence of a grading policy will be considered reasonable grounds for appeal. Appeals should be initiated as soon as possible, but no later than ***12 weeks*** after the grade has been posted. The student's failure to access grades does not provide an exemption from the time limitation.

Grade Appeal Process

1. **Student** - The student completes a Grade Appeal Form, attaching any pertinent documentation to support his/her claim.
2. **Instructor** - Within two (2) weeks of the student's request for a grade appeal, the course instructor accepts or denies the appeal in writing.
3. **Department Head** - Students who are not satisfied with the decision of the course instructor may appeal to the course instructor's department head within 30 days of the course instructor's response. Students appealing to the department head assume the burden of proof. The appeal must include: a statement of the reason the student is appealing the grade, evidence to support the appeal, the steps taken to resolve the disagreement over the assigned course grade, and the resolution sought. The department head will serve as a mediator between the student and the course instructor, but cannot change a grade. The department head must respond in writing to the student, course instructor, and dean within 30 days of receipt of the appeal with the result of the mediated discussion between the student and course instructor.

4. **Dean** - Students who are not satisfied with the result of the discussions between the student and course instructor, mediated by the department head (step 3 above), may submit an appeal to the college dean (or graduate dean in the case of a graduate student). The student must forward all documents submitted in steps 1-3 above to the college dean (or graduate dean in the case of a graduate student). If the dean concludes that the facts alleged by the student do not constitute grounds for appeal, the dean may dismiss the review. The student will not be allowed any further appeal. If the dean determines that the facts alleged by the student are true, the dean shall refer the appeal to the Final Appeal Board.
5. **Final Appeal Board** – The Provost (or designee) will convene an appeal board comprised of the following members: one tenured faculty member from the course instructor's department, chosen by the course instructor; one tenured faculty member from the course instructor's department, chosen by the Department Head; one tenured faculty member from outside the course instructor's department, chosen by the Chair of the Promotion, Tenure and Ethics (PTE) Committee; and the Provost (or designee), who does not vote, but chairs the board and handles all administrative matters.
6. **Provost** - The Final Appeal Board makes a recommendation to the Provost to change the grade to a "P" for passing or keep the course instructor's original grade. The Provost will provide a written overview of the Appeal Board's decision to all involved parties. The decision of the Provost represents a final University decision.

Questions: Contact the Office of the Registrar

Grade Changes

Grades (except incompletes) reported by a course instructor are considered permanent and final. However, requests for a change of grade after a course instructor reports a final grade will be honored to correct an error in calculating or assigning that grade. To facilitate this process, the course instructor will submit to the Registrar an email, with the Department Head copied, noting the rationale for the change and what retroactive correction is to be made. Grade changes must be processed within one calendar year (12 months) from the last date of the term in which the course was taken. This includes incomplete grades that have been changed to a grade or have converted to a failing grade. Grade changes are not permitted after a degree has been awarded.

Questions: Contact the Office of the Registrar

Auditing a Course

Occasionally, a student may wish to attend a course without earning credit (for example, to refresh course knowledge). This arrangement is called "auditing" a course. Audited courses are listed on the students' official transcript with the grade AU (audit) and no credits earned.

A student needs the course instructor's permission to audit a course. Students who want to audit a course must complete a Request to Audit Course Form, have it signed by the course instructor, and submit it to the Office of the Registrar by the end of the drop/add period specified on the academic calendar. Audits cannot be changed to a regular enrollment after the drop/add period noted on the academic calendar. Audited courses do not count toward completing program or degree requirements.

Students who choose an audit option are expected to attend the audited class and complete all course requirements (with the exclusion of the tests). If the students do not meet attendance requirements for the course, they earn the grade of WN (withdrawn for non-attendance). Once a WN grade is issued, the student may no longer attend or participate in the class. AU and WN grades do not affect the term and cumulative grade point averages.

Audited courses incur regular tuition fees; however, audits are not considered part of a course load for academic or financial aid purposes, which means that students cannot count audited credits toward a full-time student status or receive financial aid for an audited class.

Questions: Contact the Office of the Registrar

Incomplete Grades

Incomplete Grade Policy

The grade of "I" (Incomplete) is a temporary grade assigned by the instructor in cases where a student is unable to complete course requirements within the term. The grade of "I" may be issued by a course instructor for any course in which ALL the following conditions are met:

1. **Undergraduate Students and On-campus Graduate students:** Student requests the "I" grade from the instructor no later than 10th week Friday
2. The student has satisfactorily completed a substantial portion (typically about 75%) of the total coursework and has convinced the instructor of his or her ability to complete the remaining work without re-registering for the course. It is not to be given if a student is failing the course.
3. The student is unable to complete the course requirements within the regular time frame due to significant, extenuating circumstances that can be documented.
4. The student and course instructor must complete an Incomplete Grade Agreement Form that clearly states the requirements to be completed and the due date for the completion of each requirement. The form must be signed by the Department Head and submitted to the Office of the Registrar as official documentation of the agreement.

Deadline for completion of the coursework:

Undergraduate Students and On-campus graduate students: not later than Monday of Week Five of the following term.

If a final grade is not submitted within the specified deadline for completion, the incomplete grade converts to an "F" (Fail) on the student's record and will be reflected in the students' GPA. The grade of "F" will be considered a permanent grade on the student's record.

Students should note that an incomplete grade does not yet reflect credit in the course. This means if a course with an incomplete grade is a prerequisite for another course, they may not register for that course until the incomplete grade has been changed to reflect a passing grade.

Example: An incomplete is issued in spring 2018 for MATH-101. The student may not register for MATH-102 until the coursework required to fulfill the incomplete is completed and the "I" grade is removed.

Questions: Contact the Office of the Registrar

Final Examinations

Kettering University policy requires each student to participate in a comprehensive final learning experience in each course. The extent to which that experience contributes to the student's course grade may vary

by course instructor and by course, but generally amounts to between 20 and 40 percent.

Questions: Contact the Office of the Registrar

Dean's List

The Dean's List recognizes overall academic performance based upon the student's term grade point average (GPA). To be eligible for the Dean's List, students must satisfy the following requirements: be a degree-seeking student with a minimum term grade point average of 3.5, no grades below B, and a minimum of 16 earned credits for the term.

After each term grading process is complete, eligible students are recognized on the Registrar's website and in a hallway cabinet display outside the Provost's Office. Dean's List eligibility for each term is reflected on student transcripts.

Questions: Contact the Office of the Registrar

Honor Societies

Alpha Pi Mu is a national industrial engineering honor society. The eligibility of industrial engineering students is based upon superior scholarship and character of a fiduciary nature. Members of Alpha Pi Mu work responsibly to further the ideals and aims of the engineering profession.

Eta Kappa Nu is a national electrical and computer engineering honor society and has its Theta Epsilon Chapter at Kettering. Electrical engineering students who rank in the top quarter of their class are admitted after their junior year. Students ranking in the top third of their class are admitted after they become degree seniors.

Gamma Sigma Alpha is a national honor society that promotes intellectual interaction between Greek students and the academic community.

Gamma Sigma Epsilon is a national honor society recognizing scholarship in the field of chemistry has its Eta Beta Chapter at Kettering University. Its aim is to promote professionalism and scholarship in chemistry and the general welfare of its members.

Kappa Mu Epsilon was founded to promote the interest of mathematics among undergraduate students. This is fostered by activities such as outside speakers, films, student presentations, and participation in events such as National Mathematics Awareness Week.

Nu Chi is the Kettering University chapter of Delta Mu Delta initiated on February 20, 2020. Delta Mu Delta is an international honor society that recognizes academic excellence among ACBSP accredited schools. Nu Chi membership eligibility requires students to be of a junior or senior class standing, major of an undergraduate management program with a 3.7 GPA or higher, and are in the 20th percentile of their college class in cumulative average grades.

Order of Omega is an international honor society for fraternity members who have attained a high standard of leadership in inter-Greek activities.

Phi Eta Sigma, a national freshman honor society. To become a lifetime member, a student must qualify during one of the two freshman semesters. Normally about 5 percent of the class will achieve this scholastic honor.

Pi Tau Sigma, a national mechanical engineering honor society, selects members from the top-ranked junior and senior students on the basis of personality, leadership, and probable future success in mechanical engineering. The largest local chapter of this society is Kettering's Delta Chi Chapter.

Professional Leadership Honor Society Professional Leadership Honor Society, formerly Management Honor Society is an organization comprised of upperclassmen who have demonstrated leadership potential as evaluated by the management of their co-op employer. All members are appointed for one academic year. Activities consist of lunch and dinner meetings each year. Speakers are leading executives in industry and business. Members are given an opportunity to ask questions of these top executives and become acquainted with their ideas, backgrounds, and managerial philosophies.

Rho Lambda is a national honor society recognizing Panhellenic women with the highest qualities of leadership and service to their sorority.

Robot Society This honor society was organized in 1928 for the purpose of giving recognition to those students who have demonstrated outstanding leadership, citizenship, and service to the Kettering community. Scholastic standing is an added criterion for election.

Sigma Alpha Chi is a Kettering scholastic honor society founded in 1970 for the purpose of recognizing high scholarship among management students at Kettering.

Sigma Pi Sigma is a national honor society which exists to honor outstanding scholarship in physics. Membership is by invitation to students who have junior or senior standing, overall GPA of 3.0 or greater, completion of four physics courses of 3 credits or more, cumulative GPA of 3.5 or more in physics courses, standing in the top third of their graduating class and a record of active service to the Physics Department.

Tau Beta Pi is a national engineering honor society and has its Michigan Zeta Chapter at Kettering. This association offers appropriate recognition to engineering students for scholarship and exemplary character.

Upsilon Pi Epsilon is an international computer science honor society and has its Michigan Epsilon chapter at Kettering. Its mission is to recognize academic excellence in computer science. Students qualify for membership as seniors by being in the top third of computer science majors in their graduating class.

Graduation

Detailed graduation information is available on the Office of the Registrar website. This information includes important deadlines and eligibility requirements. Students should review this information carefully to ensure successful completion of the graduation process.

Kettering University awards degrees at the conclusion of each term; summer, fall, winter and spring.

Graduation Requirements

Students must apply to graduate to begin the graduation process. Students should complete a graduation application immediately after registering for their final academic term.

In order for an undergraduate degree to be awarded and verified by the Office of the Registrar, the following requirements must be satisfied:

Academic Course Requirements: Meet all specified course work, design credits, earned hours, and project requirements of the degree.

Cooperative Education Requirements:

- Students who complete their academic requirements in nine full-time terms or more must attain at least five satisfactory work evaluations at an authorized employer. Three of these five must occur after achieving Junior 1 status.
- Students who complete their academic requirements in eight full-time terms (minimum of 16 earned credit hours per term) must attain at least four satisfactory work evaluations at an authorized employer. Two of these four must occur after achieving Junior 1 status.
- Students transferring to Kettering University with 24 or more earned hours (sophomore status) must achieve at least four satisfactory work terms at an authorized employer (three after attaining junior status). The work experience terms must be earned while a Kettering University student.
- Students transferring to Kettering University with 56 or more earned hours (junior status), without a baccalaureate degree, must achieve at least three satisfactory work terms at an authorized employer. The work experience terms must be earned while a Kettering University student.
- Students transferring to Kettering University with a baccalaureate degree must achieve three satisfactory work terms at an authorized employer. The work experience terms must be earned while a Kettering University student.

Culminating Undergraduate Experience Requirement: Satisfactory thesis completion.

Academic Performance Requirements: Achieve a cumulative GPA of at least 2.0.

Financial Obligations

Diplomas are withheld until the student has satisfied all financial obligations to the University. Students cannot participate in commencement if they have not satisfied all financial obligations to the University.

Accelerated Pace to Graduate

It is possible to complete the academic portion of most Kettering degree programs in eight academic terms. Students who are interested in pursuing this possibility should contact their academic department to obtain an individualized accelerated plan and to determine if it is appropriate for them.

Final Degree Verification Letter

Students and their co-op employers may request a final letter when all requirements for graduation are met. Final letters will not be issued until all grades for the graduating term are submitted and posted to the student's record. Final letters will not be issued once a degree has been awarded; students must request an official transcript.

Graduation Honors

Academic Honors

Summa Cum Laude: Highest distinction based on a cumulative weighted grade average of 3.90 or higher.
Magna Cum Laude: High distinction based on a cumulative weighted grade average of 3.70 or higher.
Cum Laude: Distinction based on a cumulative weighted grade average of 3.50 or higher.

Questions: Contact the Office of the Registrar

Institutional Honors

Outstanding Thesis Award: Recognizes exceptional performance in Kettering's Senior Thesis Project. Candidates for this award must have received a grade of "Pass with Distinction" on their thesis and be nominated by their faculty advisers.

Questions: Contact the Academic Success Center-Thesis Office

President's Medal: Recognizes graduating seniors who have excelled in scholarship, cooperative employment, and engagement in the Kettering community and in their home community. Students are nominated by employers, faculty, and staff and are selected by a committee appointed by the President of the University. Students can only be nominated once. The number of medals given is at the discretion of the President, but generally will not exceed two percent of the graduating class.

Questions: Contact the Office of the Chief of Staff

Sobey Scholars: This award is made annually in memory of Albert Sobey, the founder and first president of GMI/Kettering University. It recognizes graduating seniors who have been elected to a national honor society and Robots [a Kettering honor society], or will graduate with academic honors. The following students receive the Albert Sobey Memorial Award:

- Biochemistry students who are elected to membership in both Gamma Sigma Epsilon and Robots
- Biology students who are elected to membership in both Beta Beta Beta and Robots
- Business students who are elected to membership in both Sigma Alpha Chi and Robots
- Chemistry students who are elected to membership in both Gamma Sigma Epsilon and Robots
- Computer Engineering students who are elected to membership in Eta Kappa Nu and Robots
- Computer Science students who are elected to membership in both Upsilon Pi Epsilon and Robots
- Electrical Engineering students who are elected to membership in Eta Kapp Nu and Robots

- Engineering students who are elected to membership in both Tau Beta Pi and Robots
- Mechanical Engineering students who are elected to membership in both Pi Tau Sigma and Robots
- Physics students who are elected to membership in both Sigma Pi Sigma and Robots
- Students who earn summa cum laude, magna cum laude, or cum laude academic honors (as of the last completed grade period) and have been elected to membership in Robots

Questions: Contact the Student Experience Office

Student Records

The Office of the Registrar maintains the students' permanent academic record, including course registrations, enrollment status and the official transcript. The Registrar's Office is the point of contact for any required enrollment and degree certifications. As such, it is important that students keep the office current with their permanent mailing address so these services can be provided.

Note: The Registrar's Office will not discuss the student record with any third party without a written consent from the student.

Address, Phone, and Name Changes

Changes in phone numbers should be made by the student through Banner Self Service. Permanent address changes can be made by contacting the Registrar's Office.

In order to process a name change, a copy of a government-issued photo ID, such as a driver's license, and either a marriage license, a Social Security card, or a court order that reflects the new name is necessary. Name changes must be processed through the Registrar's Office.

Permanent Academic Records

All information, applications, correspondence, etc., involved in admitting and processing the active progress of an admitted student are maintained for five years after the student has last been an active degree-seeking student. After five years, only the student's attendance dates, academic performance, corporate affiliate, and degree awarded are kept as a permanent record.

Transcripts

A student's official academic record is maintained by the Registrar's Office at Kettering University and is normally reflected through a transcript. All requests for transcripts must be submitted through the National Student Clearinghouse. Transcripts are $2.90 for domestic mailing or pickup and $3.90 for electronic delivery. Unofficial transcripts are available to active students on Banner Self Service.

Official transcripts from other institutions are not reissued or copied for distribution. If needed, they must be obtained directly from the issuing institution.

INFORMATION TECHNOLOGY

Information Technology (IT) is located in the Academic Building (AB), Room 2-340. All students have the privilege of using Kettering technology resources as long as they abide by the Acceptable Use of Information Technology Resources Policy, the Information Resources Policies, Etiquette & Rules, and any other IT policies as documented. Some of the major technical services provided to students are:

Help Desk

The Help Desk provides technical support for computing resources. Sending an e-mail to helpdesk@kettering.edu at any time will get the necessary resources. The staff will respond to support requests during normal business hours.

E-mail

All students have the privilege of having a Kettering University Google e-mail account. The Kettering e-mail account is the official way Kettering University faculty and staff communicate with students. Students are responsible for required actions conveyed to them through this communication vehicle, **whether or not they read the message**. Kettering provides each student with unlimited e-mail server storage. University policy is to communicate by Kettering email, to ensure FERPA compliance. Therefore, do not auto-forward to another e-mail service provider which may have less storage capacity, fewer features, and may hinder the ability to reply directly to the original email source.

Due to the proliferation of spam and phishing emails, students may receive emails requesting personal information such as usernames and passwords. Although it may look authentic, pretending to originate from a legitimate source such as Kettering, do not respond. Immediately delete it recognizing that a legitimate source such as the Kettering IT department would never ask for information such as passwords. Be cautious regarding any unsolicited email as it may contain elements that would prove to be detrimental to a personal computer.

Virus Protection

It is strongly recommended that all students install virus protection software and maintain it to protect their personal PCs. Any up-to-date properly licensed or free virus protection software would be acceptable.

It is mandatory to have virus protection installed, current, and running when connected to the Kettering network.

Internet Access

Internet access is available through the Kettering University network for business and academic purposes. Faculty, staff, and students will also have access to the Internet, as well as most network resources, using their wireless devices. Students are required to use the KUW Profile for encrypted high-speed access.

Web-Based Student Services

All students have access to a variety of online services through their web browser. They can view academic information such as grades, class schedules, and transcripts, as well as information about their financial account. They can also have access to view and update addresses, telephone numbers, and email addresses to facilitate communication with Kettering University faculty and staff.

Blackboard

Blackboard Learning Management System is leveraged for course syllabi, homework assignments, and tests. Access to Blackboard is available from anywhere a student has an internet connection. To help protect your privacy, security, and confidential information, you must sign on to Blackboard to access these services.

Virtualization

The Virtual Computer Lab (KUcloud) provides students virtual access to lab and classroom software typically only available while on campus. Virtualization provides access to classroom software anytime from anywhere.

Information and Help Sheets

Help for accessing various systems, including the Internet, is available through the Help Desk and on the IT website. The IT web pages contain valuable information to help maximize the use of Kettering University computing resources.

LIBRARY SERVICES

Kettering University Library

The Kettering University Library features digital collections and friendly personal services to support teaching, learning, and the university's research programs.

Features include digital collections, friendly service, and great space for collaborative and individual study from the Library's new home in the Kettering University Learning Commons. Access is available in person during regular hours and 24/7 for all students, both on campus and off, through the Library website. The Library supports student research by subscribing to more than 150 databases that contain academic information resources. The collection includes books, journals, technical papers, standards, streaming films, and documentaries on a variety of topics, including science, engineering, mathematics, computer science, and the humanities. The electronic reserve book collection offers copies of many textbooks to students at no cost. As students explore the Learning Commons, they will find it is also a great place to do research and collaborate.

While most of the collection is available virtually through the Library website, print books are available through a secure, touchless locker system. Resources not owned by the Library are often available through Materials on Demand, formerly known as Inter-Library Loan. LinkedIn Learning courses are available to catch up on specific skills and Mango Languages courses are ready for those interested in language learning.

Some helpful library telephone numbers include:

Phone Number	Contact
810-762-7814	Circulation
810-762-9841	Materials on Demand (MoD), formerly Inter-Library Loan
810-762-9598	Research/Instruction
810-255-9009	Text a Librarian
800-955-4464, ext. 7814	Kettering University Toll-free Number

Kettering University Archives and Special Collections

The University Archives is located in the Durant-Dort Factory One building at 303 W. Water Street near downtown Flint. It's just a twenty-minute walk along the Flint River Trail. The Archives document America's industrial and business heritage with a particular focus on the American automobile industry, the city of Flint, and the history of Kettering University.

The Charles F. Kettering Collection is one of the largest collections in the Archives and has been used by scholars worldwide. The digital photo collection now exceeds 100,000 images. A partial online catalog, along with digitized photos, can be found on the archives website. Kettering University's Curator of Special Collections may be reached at (810) 762-9690.

The Humanities Art Center Collection includes artworks that were donated to Kettering University and contains modern abstract and representational art from the 20th century. Joan Miró, Victor Vasarely, and Annie Albers are among the artists represented in the over 400 items in the permanent collection. Exhibitions are held regularly in the gallery at the Kettering University Learning Commons. The collection is open to research and loan to other institutions. For more information about the Humanities Art Center Collection, please contact Kettering University's Curator of Special Collections at (810) 762-9690 or the Library's Administrative Specialist at (810) 762-9840.

ALUMNI ENGAGEMENT

The Office of Alumni Engagement connects and engages Kettering University alumni, providing networking, volunteering and mentoring opportunities.

Each year, programming includes regional alumni receptions, an alumni award celebration ceremony, Alumni Connections Week, engagement via social media channels including Instagram, LinkedIn and Facebook, as well as volunteer opportunities, like returning to campus as an SAC speaker, making a difference in the lives of current students.

Alumni Connections Week began in 2018 in partnership with the Kettering/GMI Alumni Association. Every September, this one week event is devoted to alumni celebrating their alma mater and fellow graduates. Events are hosted by alums throughout the United States to bring alumni of all ages together, reuniting old classmates, as well as connecting alumni who have never met one another.

The Kettering/GMI Alumni Association unites and furthers the interests of alumni by fostering and assisting in the realization of the ideals of the university in order to stimulate and encourage loyalty towards the institution, provide financial assistance for educational programs, serve as a sounding board for University leadership and supporting appropriate university-sponsored alumni activities.

The KGMIAA Board is comprised of seven committees:

1. Alumni Awards
2. Alumni Involvement and Events
3. Discounts and Benefits
4. Fundraising
5. Social Media and Communications
6. Student Recruitment

Each year The Kettering/GMI Alumni Association and Kettering University recognizes outstanding and notable alumni for their professional and personal achievements with the following awards:

1. Distinguished Alumnus/Alumna
2. Extraordinary Leadership
3. Engineering Achievement
4. Entrepreneurial Achievement
5. Management Achievement
6. Civic Achievement
7. Alumni Service
8. Young Alumni

The Student Alumni Council (SAC) is jointly supported by The Alumni Engagement Office and the Kettering/GMI Alumni Association. This student organization provides its members with public speaking opportunities, as well as teamwork and leadership experiences. First formed in 1976, SAC continues to serve as a link between students and alumni. In addition to supporting student and alumni activities, SAC invites Kettering alumni to speak with current students about their time at Kettering, professional development and career path.

INTERNATIONAL PROGRAMS

Laura Mazzeo Allen, M.Ed., Director
Room 3-340 AB, 810-762-9869
international@kettering.edu

Program Overview

The Office of International Programs (OIP) is the pivotal focal point for international engagement and education for Kettering University. The OIP supports and engages with international students, professors, and other visitors who come to Kettering University from around the world. The office builds strategic international partnerships with foreign academic institutions, governments, and industries to develop programs beneficial to all parties involved. The OIP also engages the Kettering community in international learning opportunities, such as exchange visitor programs, study abroad, and international training and research opportunities.

The OIP at Kettering University works closely with the Provost, President, and all officers of the University in drawing the University's strategic vision and creating mission objectives for the institution's international education. Together, we strive to execute the University's mission by integrating international and contemporary components in all academic programs and work with all academic units/departments to enhance global studies across the curriculum.

International Student and Scholar Services

Kettering University welcomes the following international visitors:

- Full-time, degree-seeking, undergraduate and graduate students
- Short-term exchange students
- Visiting professors, scholars, and other university representatives
- Corporate employer representatives

The OIP is required by federal law to maintain certain records of international students, professors and scholars. All incoming students and scholars are required to check in at the Office of International Programs with the stamped immigration documents and passports within the first week on campus.

The OIP provides a variety of services and programs to promote the success and well-being of all international visitors at Kettering University. Located in the Academic Building (3-340 AB), our staff is available to assist all international students, international faculty and international staff. The following is a list of some of the many services the OIP provides.

Administrative Services

- Ensure that the University maintains compliance with all applicable laws and regulations formulated by the U.S. Department of Homeland Security (DHS) and other government agencies relating to international students, international faculty, international staff, and other international visitors.
- Function as liaisons to local, state, and federal government agencies and academic institutions.
- Support and engage in efforts at the local, national, and international level promoting the value of international educational and cultural exchange.
- Oversee international activities at Kettering University, and serve as advisors to international student organizations.

Immigration Services

- Provide timely, competent, and professional services to international students, international faculty, international staff, and other international visitors concerning U.S. immigration laws regulating their stay in the United States.
- Assist visitors in meeting obligations and requirements of federal regulations relating to their status and period of authorized stay in the United States.
- Determine eligibility and issue appropriate visa documents for entry to or change of visa classification within the United States.
- Assist academic and administrative departments regarding employment-based immigration processes for international faculty, researchers and staff members.

Exchange and Visa Services

- Develop and oversee student exchange and study abroad programs.
- Maintain federal regulations for international visitors, export controls, and SEVIS systems for visas.
- Offer advising on visa status maintenance for all international visitors and visa holders (such as students holding F-1 and J-1 visas, scholars holding J-1 visas, H-1B faculty, Permanent Residency for faculty, International Guest Speakers).
- Assist international students and exchange visitors with the application processes and endorsements for various non-immigrant benefits, such as practical training programs, employment, travel, and maintaining status.
- Organize orientation programs for international students and scholars to provide international newcomers with information on immigration regulations, academic issues, and social opportunities.
- Provide assistance with insurance, bank accounts, housing, applying for a driver's license, obtaining social security cards, taxation, and other settlement concerns.

F-1 Student Visas

The F-1 visa is used for students pursuing a degree at an academic or language institution within the United States. International students in F-1 status are generally enrolled in a full course of study. This visa is intended only for the purpose of study.

J-1 Student and Scholar Visas

The J-1 visa is used for students as well as exchange visitors. At Kettering University, this visa is used for visiting faculty, research scholars, and short-term scholars and students.

Important Documents for International Students and Visitors

Passport

The Passport is a document issued by an individual's home country government. It is the responsibility of the international students and scholars to keep their passport valid at all times. Although passport renewal procedures vary, all passports should be renewed 6 months prior to the expiration date.

I-94 Arrival and Departure Form

U.S. Immigration officials create this record when visitors enter the United States. It is an electronic record that can be retrieved online. The I-94 record shows when and where the visitor entered the U.S., the type of visa status the visitor holds, and how long they are eligible to stay in the United States. Students in F-1 or J-1 status are usually allowed to remain in the U.S. for the duration of status (D/S). The actual end date of their D/S is the completion date listed on the student or scholar's I-20 or DS-2019 form. I-94 numbers change every time a student re-enters the United States.

Visa

Visas to enter the United States are issued by an American Consulate abroad (usually in the student or scholar's home country) and are stamped in the student/scholar's passport. It is not possible to obtain a visa stamp inside the United States. A visa allows the holder to apply for entry into the United States at the Port of Entry. In issuing a Form I-94 at the Port of Entry, the Department of Homeland Security gives the student/scholar permission to enter the United States. The following information is listed on the visa: date issued, date the visa expires, type of visa, where it was issued, and how often the visa can be used (multiple or single).

Form I-20 or Form DS-2019

This certificate is an immigration document that indicates a particular immigration status. Form I-20 is used for students holding F-1 visas and their dependents (F-2 visa status), while form DS-2019 is used for exchange visitors holding J-1 visas and their dependents (J-2 visa holders). Even after students have left the United States, they should retain these documents as they serve as an official record of immigration history. They can also be useful for tax purposes. Please **do not discard** old certificates. The OIP only retains student records for a limited number of years and former I-20's and DS-2019's cannot be retrieved from SEVIS.

Visitors and students must:

- Notify the OIP in advance if they terminate their study, employment, or affiliation with Kettering University earlier than the date indicated on their form I-20 or form DS-2019.
- Consult with the OIP before traveling internationally to make sure their documents are signed.
- Obtain approval from the OIP before accepting work at other institutions or off campus.
- Apply with the OIP in a timely manner, if a program extension becomes necessary.

SEVIS and Immigration Regulations

SEVIS (Student & Exchange Visitor Information System) is an internet based system in which DHS (Department of Homeland Security) maintains information on non-immigrant visitors holding visas.

Services Provided for International Students and Scholars on Campus

The OIP provides services and programs that promote the success and well-being of international students and visitors at Kettering University. Our staff is available to assist all international students, scholars, and faculty.

Visa Issuance and Maintenance

- Assist international students, scholars and visitors in complying with federal, state and local regulations pertaining to immigration.
- Maintain immigration records on all international students and scholars holding F-1 and J-1 visas currently enrolled at Kettering University.
- Verify change of status and lawful presence.

Required Orientation

Orientation is required of all incoming students and scholars on F-1 and J-1 visas through the OIP. Orientation sessions are held during the week prior to the start of every term. Individual orientation can be provided to scholars who begin their program at Kettering University throughout the term. Workers on H-1B status should work with Human Resources ("HR") to engage in HR's orientation process. Orientation with the OIP includes:

- Check-in and visa registration.
- Evaluation of English proficiency and placement into ESL Program, as needed or requested.
- Information on immigration regulations and academic issues (scheduling, help with transfer credit evaluation).
- Intercultural communication and adjustment support.
- Guidance for international students as they negotiate the University system.

Enrollment

International students must engage in a full course of study during academic terms. If you will not be enrolled full-time, you must receive **prior approval** from the OIP. The OIP is required to report under-enrollment to DHS through SEVIS within 30 days of the end of the registration period. Please visit the OIP for more information.

If you have any questions regarding visa regulations or immigration laws, please contact the OIP.

Arrangement of Cultural Activities

Excursions are intended to promote intercultural understanding and present a broader experience of US American culture. The OIP, in conjunction with other departments on campus, provides cultural activities for international students and scholars throughout the year.

Required Medical Insurance Coverage

All international visitors (J-1 or F-1 principle visa holders and their dependents) are required to have medical insurance and medical evacuation and repatriation insurance for the entire duration of stay in the United States. All international students, including F-1 visa holders and exchange students holding J-1 visas are required to purchase Kettering University's student health insurance plan. The purchase of the Kettering University Health Plan is mandatory and cannot be waived.

Study Abroad Programs

The study abroad programs at Kettering University prepare students for global leadership. Globalization and increased cooperation will require those entering the 21st-Century job market to be able to function internationally. Studying abroad provides students with knowledge and experience that will give them a competitive edge to excel in the world

market. Employers recognize that applicants who have international experience are more likely to possess the qualities in demand by our global economy.

Kettering University currently offers several study abroad programs. Most programs are offered in English. New study abroad programs are continually developed, so please visit our Study Abroad website for current active programs and new opportunities in your academic areas.

Term and Traditional Semester Length Programs

Study abroad programs are primarily 12 to 16 weeks in length. The shorter programs closely align with the Kettering Fall and Spring term dates. Traditional semester programs will go into the summer and fall terms by a few weeks. All undergraduate majors at Kettering have the opportunity to go abroad and take courses that fall within their degree program at at least one study abroad location. Keep in mind that course options are limited, may change, or may have prerequisites. Students are encouraged to visit the Study Abroad website to learn more about these programs.

Short Term Programs

Short, 5- to 15-day educational based programs abroad are being regularly offered. Please visit our Study Abroad website for current details and opportunities.

Course Work

The coursework taken through a Kettering University Study Abroad Program is fully applicable toward credits in the student's degree program for up to 20 credit hours, ***as long as the courses taken while abroad are approved for credit prior to taking the course.*** Courses that are not already pre-approved to come back for credit may be reviewed to come back to Kettering for credit. This process should be initiated with the OIP prior to taking the course, ideally more than 3 months prior to departure for the study abroad program. Please visit the Study Abroad website for details on the course approval process and appeals process. Coursework taken on a study abroad program will appear on a student's transcript as Credit or No Credit.

Required Courses

The study abroad curriculum requires participants to register for a 4-credit Advanced Social Science elective (SSCI-398 or HUMN-398) and a 4-credit Free Elective Language Course (LANG-297) as two of the five classes taken abroad, whenever approved classes are offered by the partner institution.

Course Credit and Grading for Laboratory Courses Taken at German Partner Universities:

Students enrolled in our German partner universities receive a grade of P (Pass) or F (Fail) for *laboratory* courses. In the German system, a P grade is equivalent to a D grade or higher (may be dependent upon individual university policy). Kettering University students enrolled in laboratory courses at our partner German universities who receive a P grade will be granted credit for the course upon receipt of an official record.

Courses Offered at International Universities (and Kettering University Equivalent Course):

Courses currently approved to come back for credit toward a specific Kettering University course may be found on the Study Abroad Website. Please note that this list is subject to change based on the availability of resources at the international universities and as stated above, additional courses and programs may be reviewed to come back for credit based on the student requesting a course review in a timely and appropriate manner.

Academic Requirements

Students applying for a study abroad program must be in good academic standing, maintain a GPA of 2.5 or higher, have passing grades in all courses taken in the past two academic terms, must meet specific degree program requirements for study abroad and have degree department approval. Some study abroad programs also have stricter requirements than those listed here - please see the Study Abroad website for program-specific details. Students who may not meet this criteria may appeal for an exemption in order to be eligible to go abroad. The appeal process is outlined on the Study Abroad website.

Financial Considerations

To encourage undergraduate students to participate in the study abroad programs, Kettering University has agreed to provide these terms as "cost neutral" as possible when compared to the expenses for tuition, room, board and transportation during a typical term on campus. Some variation should be expected and some programs may have additional fees and costs attached. All students who opt for an academic term abroad will register for a study abroad term at Kettering University and pay the regular Kettering University tuition. Pilot programs (new programs not listed in this catalog) may have additional/different cost structure. The OIP can assist students as they consider pilot program options.

Study Abroad Stipends

Kettering University provides up to $1,500 per student as a stipend for study abroad programs at each degree level. Participants may use the stipend funding on multiple programs (short-term and semester length), but amounts applied to the program will vary based on the individual program length and cost. Students participating in term and semester length programs will be eligible for the up to $1,500 amount. Students must receive class credit during the study abroad experience or be participating in an OIP approved short-term study abroad program to be awarded a stipend.

Students are able to borrow against this stipend up to three months in advance. This loan is intended to provide students with funds necessary for purchasing round-trip airline tickets, passports, and any other expense that needs to be covered prior to departure. Several universities abroad require either partial or total housing payment prior to arrival. This payment will be made by wire transfer and will reduce the amount available. Students with a balance on their account may not be able to withdraw the stipend.

Please note that the stipend may be revoked if the student awarded decides to cancel their study abroad trip, does not complete required study abroad pre-departure and arrival requirements for both Kettering University and the host institution, if the study abroad experience is canceled, and/or if the student is dismissed from the study abroad program for violations of the Student Code of Conduct (for either host or Kettering University), violations of the Study Abroad agreements and policies, and/or for acts that cause the termination of a student's visa or deportation from the host country. For more information on this policy and the appeals process, please visit the Study Abroad website or contact the OIP.

Application

Application materials may be found on the Study Abroad website. Students are encouraged to make an appointment with the OIP by calling (810) 762-9533 or e-mailing studyabroad@kettering.edu to find out more

about completing academic advising for study abroad. It is advisable to apply for a program 5 terms in advance of the term a student wishes to study abroad.

Orientation

Students enrolled in a study abroad program are required to attend orientation and complete all online orientation components. The orientation will provide practical, logistical, and cultural information to prepare for studying and living overseas.

Oswald International Student Fellows Program

The Oswald Fellowships at Kettering University sponsor international travel, teaching, and research opportunities for students, faculty, and staff members and are made possible by a gift from Kettering alumnus and trustee Bob Oswald '64 and his wife Marcy. Oswald International Student Fellows Program provides financial grants for travel and living expenses for Kettering students involved in the international exchange program and other approved study abroad programs. Grants are awarded multiple times each academic year on a competitive basis. In general, consideration is given to the financial need and merit of the student. Selected students will receive grants between $100 and $2,500 in addition to the Kettering Study Abroad stipend provided for study abroad students.

To be eligible to become an Oswald International Student Fellow a candidate must:

- Be in good standing at Kettering University and have been approved for study abroad by the academic department.
- Plan to participate in a study abroad program during the upcoming study abroad term. Any students approved for a study abroad program that is eligible for the Oswald Student Fellows Program will be given access to the appropriate Oswald application on the Study Abroad website.
- Demonstrate a financial need.
- Demonstrate merit in academics, leadership, and service.
- Complete an application including an essay and letters of recommendation by the specified deadlines. Application information will become available to students after the study abroad application deadline for a specific term.

Oswald International Faculty Fellowships

The Oswald Fellowships at Kettering University sponsor international travel, teaching, and research opportunities for faculty members and are made possible by a gift from Kettering alumnus and trustee Bob Oswald '64 and his wife Marcy.

The purpose of the Oswald International Scholars Program is to increase mutual understanding as well as educational and cultural exchange involving Kettering faculty members and scholars from international institutions. Applicants are encouraged to reach out to any international institution, however, preference will be given to applications indicating collaboration with existing Kettering partners as listed: **China** at Xi'an Polytechnic University, Hubei University of Automotive Technology, Guangxi University of Science and Technology, Wuhan University of Technology, and Qingdao Hengxing University; **Germany** at Reutlingen, Esslingen, Konstanz, and Ulm; **Singapore** at Singapore Institute of Technology; **Spain** at the Public University of Navarre; **South Korea** at Ajou University and Kookmin University; and **Vietnam** at Ho Chi Minh University of Technology and Education.

Through the Oswald International Scholars Program, Kettering University will assist with the costs for Kettering faculty members to work abroad during their off terms with the expectation that the international partner/host would provide support for their faculty members to spend time working on the Kettering University campus. The application process for the Faculty Fellowship may be found here.

English as a Second Language Program

At this time, The English as a Second Language Program (ESLP) is inactive. If the need arises, and there is enough enrollment to warrant running an ESLP Program, then the following opportunities and policies will be followed. When active, the ESLP is able to offer four types of programs to speakers of English as an Additional Language when the interest and enrollment warrants: (1) traditional, intensive English program on campus; (2) short-term English programs on campus; (3) Technical English classes for IEP programs on campus and online; and (4) online English classes. A brief description of each program is provided below.

Intensive English Program

The following courses can be offered on campus depending on need. Each course is 20 hours of direct instruction per week for the length of the term. Placement tests are conducted in orientation week, the week prior to the start of class each term. Students who successfully complete this program also fulfill English language requirements for admission into Kettering's degree programs. For more information on each course, please follow the links provided below.

ESL-096 Intermediate 1 (0 Credits)

ESL-097 Intermediate 2 (0 credits)

ESL-098 Advanced 1 (0 credits)

ESL-099 Advanced 2 (0 credits)

Short-term English Programs

The ESLP is able to offer short-term on campus programs for students from partner universities. These short-term programs typically run in January, July, or August.

Technical English Classes

Technical English classes are term length English classes provided either on campus or virtually as a part of International Education Programs (IEP) to participants (delegates) from partner companies.

ESL-091 Technical English for IEP (0 credits)

Online English Classes

Kettering's ESLP is able to offer several online English courses, when desired. These online English courses are specifically designed for online instruction and run for 10 weeks, providing 40 hours of live instruction to participants. Students will receive materials to study before each class and take quizzes afterwards. Students who successfully meet the class

requirements are awarded a certificate of completion. These courses are not credit bearing.

For more information on our programs and services please contact the OIP in the following ways:

Visiting: Room 3-340, Academic Building

Website: https://my.kettering.edu/page/office-international-programs

OIP Phone: (810) 762-9869

General email:international@kettering.edu

Study Abroad email: studyabroad@kettering.edu

ESLP Email: eslp@kettering.edu

ADMINISTRATION AND FACULTY

Senior Administration

Dr. Robert K. McMahan, Jr., President
Dr. James Z. Zhang, Senior Vice President, Academic Affairs and Provost
Ms. Marsha Bewersdorf, Vice President, Administration and Finance
Mr. Geoffrey Marsh, Vice President, Instructional, Administrative, and Informational Technology
Ms. Suzanne Petrusch, Interim Vice President, Enrollment and Co-operative Services
Mr. Dale Pilger, Vice President, University Advancement and External Relations
Ms. Enza Sleva, Vice President and Chief Student Experience Officer
Dr. Kathryn Svinarich, University Chief of Staff
Ms. Jennifer Umberger, Vice President, University Marketing and Communications

Deans and Head of School

Dr. Scott Grasman, Dean, College of Engineering and Computer Science, Professor of Industrial Engineering
Dr. Terence J. Pitre, Dean, School of Management, Professor of Accounting
Dr. Scott W. Reeve, Dean, Graduate School and Sponsored Research, Professor of Chemistry
Dr. Ronald Tackett, Head of School, School of Foundational Studies, Associate Professor of Physics

Academic Department Heads

Dr. Susan Farhat, Department of Chemical Engineering and Materials Science
Dr. Lisa Gandy (Interim), Department of Computer Science
Dr. Farnaz Ghazi Nezami (Interim), Department of Industrial and Manufacturing Engineering
Dr. Javad Baqersad (Interim), Department of Mechanical Engineering
Dr. Mark Thompson, Department of Electrical & Computer Engineering

Faculty

School of Foundational Studies

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Terence Pitre, Dean, School of Management, Professor of Accounting, University of Louisiana-Lafayette, BS, Finance, 1992; Tulane University, MBA, Finance and Accounting, 1994; Michigan State University, Ph.D., Accounting, 2004

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Endowed Chairs and Professorships

Endowed chairs are among the traditional hallmarks of the best institutions of higher education and Kettering University is particularly proud to have been singled out for five such chairs since its independence. Outstanding teacher/scholars are named to hold these distinguished positions--to the benefit of students throughout the University.

The **Frances Willson Thompson Chair of Leadership Studies** was established by Mrs. Thompson of Flint, Michigan. It memorializes the role that members of her family have played in the development of American industry, particularly William C. Durant and Governor Henry Howland Crapo.

The **Eugene W. Kettering Chair of Power Engineering** was endowed by the Kettering Fund of Dayton, Ohio, in honor of Eugene W. Kettering who had a distinguished career in the field of diesel locomotion and was a prominent philanthropist.

The **F. James McDonald Chair of Entrepreneurial and Intrapreneurial Leadership and the F. James McDonald Supply Chain Operations Professorship** were endowed by nearly 700 GM dealers throughout the United States in honor of Mr. McDonald's many contributions to the automotive industry. A 1944 graduate of GMI/Kettering, Mr. McDonald is retired president of General Motors Corporation.

The **Alfred Grava Chair in Manufacturing Management** was endowed by Dr. and Mrs. Martin (Skip) Walker to honor the late Al Grava. Walker, a 1954 GMI graduate and former chairman/CEO of the M.A. Hanna Company, and Grava, a 1957 GMI graduate and former president of Masco-Tech Automotive Systems Group, were classmates at GMI and lifelong friends.

The **Robert and Claire Reiss Chair of Industrial Engineering** was established by Robert E. Reiss and his wife Claire. Bob is a 1960 Industrial Engineering graduate and former member of the university's Board of Trustees. He was President and CEO of Interventional Technologies, a company he founded and later sold to Boston Scientific.

The chair focuses on both teaching and research within an area of concentration relating to industrial engineering.

The **Robert Bosch Centennial Professorship** was established with a gift from the Robert Bosch Corporation of Stuttgart, West Germany, and its American units in honor of the company's 100th anniversary. The fund supports research of distinguished professors in electrical and mechanical engineering on a two-year, rotating basis.

The **Losh Family Business and Engineering Management Endowed Professorship** focuses on engineering, STEM, and business. The selected professor will develop business programs coupled with technical management skills and operation management along with entrepreneurial skills to uniquely prepare the next generation of business leaders.

Emeritus Faculty

Basem Alzahabi, Professor Emeritus of Mechanical Engineering
B.S. 1981, Damascus University (Syria); M.S,1986, University of Michigan; M.S. 1988, University of Michigan; Ph.D. 1996, University of Michigan

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Evan F. Bornholtz, Professor Emeritus of Accounting and Finance
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James C. McLaughlin, Professor Emeritus of Electrical Engineering
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David E. Parker, Professor Emeritus of Applied Physics
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UNDERGRADUATE COURSE DESCRIPTIONS

The catalog menu item **Courses A-Z** has all Kettering's courses listed with their descriptions for all university courses; the descriptions appear in alphabetical order according to their course letter designations. These descriptions include any prerequisites (requirements student must satisfy before registering for the course), corequisites (requirements students must satisfy either before or while taking the course), the number of credit hours applied for each course, and, where relevant, the hours devoted to lecture, recitation, and laboratory (see applicable department sections for the total credits required for each major or program). If no indication exists for lecture, discussion and laboratory hours, then the course is considered a lecture.

Students should be aware that the courses listed here are subject to change. Many courses are regularly offered in the fall, while others are offered in the winter or summer. However, semester enrollment, course demand, changes in faculty and other factors will sometimes affect the offering of courses. In addition, new courses may have been added and changes in existing courses may have occurred since the beginning of this catalog year.

The course numbers 191, 291, 391, and 491 shall be used to describe Special Topics courses at introductory, intermediate and advanced levels, respectively. Special Topics courses are one-time offerings whose content is determined by current faculty interest. These courses may be repeated for credit when the course is run with different content.

The course numbers 197, 297, 397, and 497 shall be used to admit credit for transfer or guest courses that are not equivalent to existing Kettering courses within a discipline. The subject **FREE** (e.g FREE-297) is used to admit transfer or guest courses that are not equivalent to Kettering courses, and do not fall within existing Kettering disciplines.

The course numbers 298, 398, and 498 shall be used to describe elective courses taken as part of a Kettering University Study Abroad Program.

The course numbers 399 and 499 describe an independent study course. Independent study is student-directed exploration with faculty guidance at an advanced level. This course may be repeated for credit when the course is run with different content.

Sample Course Description

BIOL-441 Cellular Biology 4 Credits
Corequisites: BIOL-442
Prerequisites: CHEM-351
Minimum Class Standing: Junior
An introduction to the structure and function of cells. Topics include cell motility, intracellular transport, cellular chemistry, membranes, organelles, metabolism, reproduction, and signaling.
Lecture: 4, Lab 0, Other 0

Course availability is subject to change due to low enrollment or faculty availability.

Courses A-Z

Undergraduate

Courses numbered 000 - 499 are Undergraduate level courses. Visit the Undergraduate Course Descriptions page (p. 94) for detailed information on the course format and numbering schema.

Graduate

Courses numbered 600 - 699 are Master level courses.
Visit the (Master's Level) Graduate Course Descriptions page for detailed information on the course format and numbering schema. Also, **Mezzanine courses, numbered 500 - 599**, are available for graduate students.

Biology (BIOL)

BIOL-141 General Biology 3 Credits
Corequisites: BIOL-142
Prerequisites: None
This course serves as a general biology course. It will cover topics including basic biochemistry, cells, cell division, classification of organisms, populations, communities, and biomes. The life cycles and biology of single-cell and multicellular organisms will also be covered.
Lecture: 3, Lab 0, Other 0

BIOL-142 General Biology Lab 1 Credits
Corequisites: BIOL-141
Prerequisites: None
This course serves as a general biology laboratory. It will provide hands-on experience with areas of basic biology including basic biochemistry, cells, cell division, classification of organisms, populations, communities, biomes, and single-cell and multicellular organisms.
Lecture: 0, Lab 2, Other 0

BIOL-143 Biology in Modern Society 4 Credits
Prerequisites: None
Biology is the science of life, and the science permeates all aspects of our lives, ranging from the food we eat and the air we breathe to the interactions we have with others and the environments in which we live. Because of this, as well as new and developing methods on biological topics, it is important as humans in today's society that we understand the myriad of manners in which biology fits into our lives and society as a whole. To this end, we will focus on exploring our natural environment and various ways in which we, as humans, interact with the environment, historically and presently, and discuss biological, social, and environmental impacts of these interactions on the environmental and human society.
Lecture: 4, Lab 0, Other 0

BIOL-241 Human Biology 3 Credits
Corequisites: BIOL-242
Prerequisites: (CHEM-135 and CHEM-136) or (CHEM-136 and CHEM-137)

Minimum Class Standing: Freshman 2
This course serves as the second general biology course and focuses on humans. It will cover topics including basic biochemistry, cells, cell division, the organization and regulation of biological systems, human genetics and chromosomal inheritance, biotechnology, and various human organ systems.
Lecture: 3, Lab 0, Other 1

BIOL-242 Human Biology Lab 1 Credits
Corequisites: BIOL-241
Prerequisites: (CHEM-135 and CHEM-136) or (CHEM-136 and CHEM-137)

Minimum Class Standing: Freshman 2
This course serves as the second general biology laboratory. It will cover topics including basic biochemistry, cells, cell division, the organization and regulation of biological systems, human genetics and chromosomal inheritance, biotechnology, and various human organ systems.
Lecture: 0, Lab 2, Other 0

BIOL-311 Ecology 4 Credits
Prerequisites: BIOL-141
An introductory ecology course that will examine human interactions and the resulting effects of these actions on plant communities, animal communities, and the physical environment. Areas such as water, energy, agriculture, industry, recreation, and demographics are considered. Emphasis will be placed on conservation, pollution, energy, and other contemporary concerns.
Lecture: 4, Lab 0, Other 0

BIOL-321 Biological Techniques I 4 Credits
Prerequisites: BIOL-241
An introductory laboratory course that will cover some of the most widely used experimental procedures used in the biological and biotechnological fields. Basic laboratory techniques, sterile technique, electrophoretic techniques, nucleic acid isolation, manipulation, amplification, and cloning will be covered. You will also gain familiarity with types of equipment frequently used in the biological laboratory.
Lecture: 1, Lab 3, Other 0

BIOL-331 Biological Techniques II 4 Credits
Prerequisites: BIOL-321
This course is the second of the introductory laboratory courses that will cover some of the most widely used experimental procedures used in the biological and biotechnological fields. Basic equipment/instrumentation, laboratory techniques, and sterile techniques will be reviewed. Protein/enzyme assays, purification, and analysis will be covered in detail. The student will also gain familiarity with the design of experiments.
Lecture: 1, Lab 3, Other 0

BIOL-341 Anatomy and Physiology 4 Credits
Prerequisites: (BIOL-241 and BIOL-242) or MECH-350
Minimum Class Standing: Sophomore
An introduction to Human Anatomy and Physiology. This course will cover topics including the organization and regulation of biological tissues, organs and organ systems as well as human development.
Lecture: 4, Lab 0, Other 0

BIOL-351 Genetics 4 Credits
Prerequisites: None
Minimum Class Standing: Sophomore
An introduction in the study of inheritance in all of its manifestations. Specifically, it introduces theory and problem solving in the three areas of Genetics: Classical Genetics, Molecular Genetics, and Population Genetics. Topics include Mendelian Genetics, sex-linkage and pedigree analysis, non-Mendelian patterns of inheritance, the molecular basis of inheritance and gene expression, the theory of methodology of modern DNA technologies, and population genetics and evolution.
Lecture: 4, Lab 0, Other 0

BIOL-361 Microbiology 4 Credits
Corequisites: BIOL-362
Prerequisites: BIOL-242
An introductory microbiology course comprised of topics including microbial cell structure and function, metabolism, growth and regulation, diversity, genetics, host-microbe interactions, disease and microbial ecology. This course will cover viruses, archaea, fungi, and protists but the main focus of the course will be on bacteria.
Lecture: 4, Lab 0, Other 0

BIOL-362 Microbiology Lab 3 Credits
Corequisites: BIOL-361
Prerequisites: BIOL-242
A laboratory course which covers a number of microbiological procedures and topics including microbial cultivation, isolation, and identification utilizing sterile technique. This course will cover microbial pathogenesis, sensitivity to antimicrobial agents, immunity, and the interaction of microbes with their environment.
Lecture: 0, Lab 3, Other 0

BIOL-381 Molecular Biology 4 Credits
Corequisites: BIOL-382
Prerequisites: BIOL-141 and BIOL-142
The basic theory and methodology of Molecular Biology is covered. Concepts to be examined include how biological structure determines function, mechanisms and regulation of replication, transcription, and translation, processing of mRNA transcripts and proteins, and mechanisms underlying basic cellular activities.
Lecture: 4, Lab 0, Other 0

BIOL-382 Molecular Biology Lab 3 Credits
Corequisites: BIOL-381
Prerequisites: BIOL-141 and BIOL-142
This laboratory course serves as an introduction to methods utilized to study molecular biology. Laboratory techniques will include molecular cloning, RNA isolation, extraction, purification, and quantification, site-directed mutagenesis, and data interpretation. The course is designed for the junior level and is meant to be taken simultaneously with BIOL 381.
Lecture: 0, Lab 3, Other 0

BIOL-441 Cellular Biology 4 Credits
Corequisites: BIOL-442
Prerequisites: CHEM-351
Minimum Class Standing: Junior
An introduction to the structure and function of cells. Topics include cell motility, intracellular transport, cellular chemistry, membranes, organelles, metabolism, reproduction, and signaling.
Lecture: 4, Lab 0, Other 0

BIOL-442 Cellular Biology Lab 3 Credits
Corequisites: BIOL-441
Prerequisites: CHEM-351
Minimum Class Standing: Junior
An introduction laboratory utilizing methods to study cell biology and physiology. Laboratory techniques will include microscopy, yeast transformation, cellular assays (luminescence or ELISA), cell fractionation, Western Blotting, tissue culture, DNA transfection, and assays specific to assessment of drug activity or induction of chemical pathways. The course is designed for the senior level and is meant to be taken simultaneously with BIOL 441.
Lecture: 0, Lab 3, Other 0

BIOL-494 Research Methods 4 Credits
Prerequisites: BIOL-381 and BIOL-382
A capstone course where students design, execute, analyze and report the results of original research in collaboration with a faculty member. Students are required to give a formal presentation of their findings.
Lecture: 0, Lab 4, Other 0

Business (BUSN)

BUSN-103 Introduction to Marketing 4 Credits
Prerequisites: None
An overview of marketing's role in connecting business to consumers will be provided. Emphasis is placed on analyzing the external marketing environment and customers' needs as a basis for developing a firm's marketing strategy. Topics include: marketing research, identifying opportunities, market segmentation, targeting customers, consumer behavior, the business-to-business market, business-to-business buying behavior, product and service planning of existing and new offerings, integrated promotion planning, logistics and channel development, and price planning. SAP exercises may be used in this course to illustrate marketing processes.
Lecture: 4, Lab 0, Other 0

BUSN-134 Personal Financial Management 4 Credits
Prerequisites: None
The course covers the basic principles needed for effective personal financial management; including creating, organizing, implementing, monitoring, and revising a personal plan to achieve financial objectives and goals. The topics covered include cash management and budgeting; establishing and maintaining good credit; managing consumer credit and student loans; investing in stocks, bonds, and mutual funds, and income tax planning. The course also covers long-term financial planning topics such as housing decisions, insurance, retirement planning, charitable giving, and estate planning. The course covers strategies to avoid financial scams, fraud, and identity theft.
Lecture: 4, Lab 0, Other 0

BUSN-152 Information Systems 4 Credits
Prerequisites: None
This course focuses on how organizations use information systems to effectively compete in the global economy. Topics include: information systems and their use in today's global businesses, enterprise applications, the role of information systems in organizational strategy, e-commerce, digital markets and digital goods, IT infrastructure and emerging technologies, database and information management, systems design, telecommunications, the internet, and wireless technology.
Lecture: 4, Lab 0, Other 0

BUSN-191 Business Special Topics 4 Credits
Prerequisites: None
Lecture: 4, Lab 0, Other 0

BUSN-221 Financial Accounting 4 Credits
Prerequisites: MATH-100 or MATH-101 or MATH-101X
The principles, practices and procedures used by accountants in processing business data are covered in this course. Units of study include the elements of the accounting cycle plus accounting for cash, accounts receivables, inventory, plant and equipment, investments, intangibles, liabilities, and corporate ownership. Ethical issues are addressed with research into various accounting scandals.
Lecture: 4, Lab 0, Other 0

BUSN-222 Managerial Accounting 4 Credits
Prerequisites: None
Minimum Class Standing: Sophomore
The use of financial information in the making of managerial decisions is the focus of this course. Subject areas include the calculation of the costs of products and services, budgeting, performance analysis, cost-volume- profit analysis, and assessing relevant costs. This course also addresses the ethical issues in managerial accounting. It is highly recommended that students take BUSN-221 prior to taking this course.
Lecture: 4, Lab 0, Other 0

BUSN-271 Statistics for Business 4 Credits
Prerequisites: MATH-100 or MATH-101 or MATH-101X
Introduction to statistical methods to support quantitative decision analysis for solving business problems. Topics covered include probability, sampling, estimation, hypothesis testing, analysis of variance, and linear regression.
Lecture: 4, Lab 0, Other 0

BUSN-303 New Venture Creation: Entrepreneurship 4 Credits
Prerequisites: None
Minimum Class Standing: Sophomore
The development of an innovative product, service or delivery method into a feasible business model will be the focus of this course. Students will identify a particular customer need that can be met with a novel approach using a combination of resources, including technology, marketing or financial acumen. Student teams will develop a business plan and stakeholder/investor presentation suitable for actual funding in one of the following areas: New Venture Entrepreneurship, Social Entrepreneurship or Intrapreneurship.
Lecture: 4, Lab 0, Other 0

BUSN-304 Innovation Development 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Intrapreneurship, the activity of value creation within an existing enterprise, is presented to prepare students to be innovators in their employing organizations. Strategies are introduced to innovation development as practiced by exemplary innovators. Structures are presented that support a successful innovation development environment. Processes utilized for innovation development are contrasted and a general approach is presented with specific application to a course project. Tools and techniques are presented and practiced by students during the completion of the project requirements.
Lecture: 4, Lab 0, Other 0

BUSN-312 Management Science 4 Credits
Prerequisites: BUSN-271 or MATH-258
Minimum Class Standing: Junior
Methods of process analysis and quantitative modeling are synthesized to evaluate and propose solutions to improve business processes. This course introduces decision situations that managers face in the workplace and applies problem solving methods to formulate decisions and implement solutions. Methods applied include problem solving frameworks, data visualization, descriptive analytics, predictive models, optimization models, and simulation analysis. The development of spreadsheet modeling skills is a primary learning objective.
Lecture: 4, Lab 0, Other 0

BUSN-321 Entrepreneurial Thinking 4 Credits
Prerequisites: ECON-201
This course is designed to help students gain both intellectual and practical understanding of the role of the entrepreneur in value creation and wealth generation, the attributes and mindsets of successful entrepreneurs, tools for problem/opportunity recognition including resource identification, value proposition design, and risk assessment and management. Instruction will consist of lectures, in-class exercises and discussions.
Lecture: 4, Lab 0, Other 0

BUSN-331 Financial Management 4 Credits
Prerequisites: BUSN-221 and ECON-201
Minimum Class Standing: Junior
The role financial management plays in the successful operation of a business enterprise will be identified and discussed. Subject areas include financial statement analysis, risk and return, debt and equity valuation, capital structure management, capital budgeting, and working capital management. Ethical issues facing managers are also emphasized.
Lecture: 4, Lab 0, Other 0

BUSN-332 Financial Markets 4 Credits
Prerequisites: ECON-201
Students will be provided with (1) the theoretical models that underlie the value of stocks and bonds and how these instruments are purchased, (2) an understanding of various financial securities and the financial institutions that create and trade them, (3) investment alternatives such as derivative products, mutual funds, foreign exchange, and commodities.

Lecture: 4, Lab 0, Other 0

BUSN-342 Product Marketing Management 4 Credits
Prerequisites: BUSN-103
A foundation of knowledge and skills necessary to be an effective Product Marketing Manager will be provided. Students will learn how to effectively manage products throughout their entire life cycle. The class will cover the critical aspects, both on the strategic and tactical levels that are necessary so that product marketing is an ongoing learning experience to ensure continuous improvement.
Lecture: 4, Lab 0, Other 0

BUSN-362 Lean Supply Chain Management 4 Credits
Prerequisites: BUSN-221 and BUSN-312
Students will be provided with an overall understanding of the management of operations activities of Supply Chain Management (SCM). The course covers concepts, trends and technologies that enable global SCM. Students will learn how customer needs, competitive advantage, operational measures and financial performance support successful implementation of SCM. They will also learn how operational activities including information systems, procurement, demand planning and forecasting, inventory management, and logistics support organizational goals. The philosophy and techniques of Lean Systems are applied to SCM. Lean methods are contrasted with Traditional Operations Management approaches common to many businesses. ERP simulation instruction is utilized to develop skills in logistics and demonstrate the importance of enterprise systems in managing the supply chain.
Lecture: 4, Lab 0, Other 0

BUSN-371 Business Analytics 4 Credits
Prerequisites: BUSN-271 or MATH-258
This course introduces students to an important business trend in the utilization of “Big Data” for business intelligence. The course will include coverage of data mining techniques, and the data infrastructure required to support business analytics. Software tools will be applied at an introductory level to provide students with hands-on experience in data mining. Assigned projects will require students to apply their knowledge to develop and critically evaluate actionable initiatives for business analytics.
Lecture: 4, Lab 0, Other 0

BUSN-402 Business Law 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
An introduction to the law and legal institutions in society, with emphasis on areas of law relevant to business. This class is open to both business and non-business students. Course topics include the fundamentals of business law and all of the major components.
Lecture: 4, Lab 0, Other 0

BUSN-421 Lean Operations Management 4 Credits
Prerequisites: BUSN-221 and BUSN-312
Minimum Class Standing: Junior
This course provides students with the principles and applications of Lean Enterprise and other leading models of operational excellence for office, service, distribution, and production operations. Lean Transformation methods are introduced to quantify the potential of Lean operations and provide a roadmap to transformation of the enterprise. Lean Work Flow methods are practiced to experience Lean operational work and materials management. Lean Work Design techniques are applied to structure work processes for output to meet customer demand, as well as rebalancing given changes in the demand rate. Integrating Experiences that schedule and manage operational activities of Lean Systems are applied throughout the course culminating in a comprehensive application exercise.
Lecture: 4, Lab 0, Other 0

BUSN-429 Entrepreneurial Finance 4 Credits
Prerequisites: BUSN-303
This is a course on financing startups and other small businesses. The objective is to provide students with an understanding of how financing from venture capital and private equity funds, as well as angel investors, finds its way to entrepreneurial ventures. The course follows a basic framework for study and analysis via the life cycle of an entrepreneurial venture consisting of (a) opportunity recognition, (b) valuation and terms of financing, (c) growing the entrepreneurial venture, and (d) harvesting the venture to create profits through Initial Public Offerings (IPOs) or a sale of the business. Students will examine the financial concepts, tools, and techniques for a successful entrepreneurial venture, with an emphasis on the financial management practices needed to secure financing and using business valuation models.
Lecture: 4, Lab 0, Other 0

BUSN-433 Strategic Investment Mgmt 4 Credits
Prerequisites: MGMT-314
An in-depth understanding of investments is provided. Students develop an understanding of debt and equity securities as well as derivatives. Theories of investment strategies and techniques are applied through course assignments and case analyses. Topics include the relationship between risk and return, portfolio management theories, behavioral finance, equilibrium arbitrage theories, market efficiency, and security analysis.
Lecture: 4, Lab 0, Other 0

BUSN-456 Database Management Systems 4 Credits
Prerequisites: BUSN-152
Minimum Class Standing: Junior
Introduction to the concepts, principles, issues and techniques for managing corporate data resources. Techniques for managing the design and development of large database systems including logical data models, concurrent processing, data distribution, database administration, data warehousing, data cleansing, and data mining will be covered.
Lecture: 4, Lab 0, Other 0

BUSN-459 International Business 4 Credits
Prerequisites: ECON-201 and MGMT-104
The course introduces students to international business and management by studying cultural differences, various governmental regulations, and business structures in a global economy. Other topics include legal and labor agreements, international finance, trade relations, production operations, information technology, global marketing, and human resources planning & development for MNC's.
Lecture: 4, Lab 0, Other 0

BUSN-522 Business Statistics 4 Credits
Prerequisites: None
Solving complicated business programs in today's increasingly competitive global marketplace demands new thinking and new skills. This course is designed to provide insight for learners about how to collect, analyze and interpret data in order to make sound business decisions. Probability analysis, sampling, hypothesis testing, descriptive and inferential statistics along with additional tools and techniques used by business professionals in market research, business forecasting and risk mitigation are employed.
Lecture: 4, Lab 0, Other 0

Chemical Engineering (CHME)

CHME-100 Introduction to Chemical Engineering 4 Credits
Prerequisites: None
Students will be introduced to the discipline of chemical engineering. Class topics include discussion of what chemical engineers do in practice, basic calculations related to chemical engineering, hands-on experiences to improve the understanding of how basic chemical processes work, experiments to demonstrate core concepts, team work skills, time management, spreadsheet and process flow diagram development, and student research opportunities.
Lecture: 4, Lab 0, Other 0

CHME-200 Mass & Energy Balance 4 Credits
Prerequisites: (MATH-100 or MATH-101 or MATH-101X) and (CHEM-135 or CHEM-137)
Minimum Class Standing: Sophomore
An introduction to the study of mass and energy balance for small and large scale industrial plants. The application of mass balances for individual species for steady state operation of systems with chemical reactions is discussed. The energy balances for components and systems will be analyzed to find the energy requirements for operations at industrial scale.
Lecture: 4, Lab 0, Other 0

CHME-210 Chemical Engineering Thermodynamics 4 Credits
Corequisites: MATH-203
Prerequisites: CHME-200
Minimum Class Standing: Sophomore
This course will cover a wide range of topics related to chemical engineering thermodynamics. Energy and entropy balances will be utilized for analyzing small and large scale processes with multiple streams to compute work-loads, energy exchange, and energy efficiency. Computation of thermodynamic properties, as well as free energy and chemical potential, for ideal and non-ideal systems will be discussed using charts, tables, and equations of state. Vapor/Liquid equilibrium (VLE) for both ideal and non-ideal systems will be introduced, with focus on both equations of state and activity models. Fugacity, chemical potential, and partial properties will be discussed. Some advanced topics like reaction equilibrium and liquid-liquid equilibrium systems may also be introduced.
Lecture: 4, Lab 0, Other 0

CHME-225 Computing in Chemical Engineering 2 Credits
Corequisites: MATH-102
Prerequisites: CHME-200
This course introduces the basics of computer programming and its applications to the solution of chemical engineering problems. The student learns about advanced spreadsheet applications and useful computer programs for chemical engineers like Matlab, Polymath, and the Aspen process simulator. The student develops a basic toolset to tackle common tasks like numerical integration, curve fitting, ODE solutions, and data graphics.
Lecture: 2, Lab 0, Other 2

CHME-230 Foundations of Materials 4 Credits
Prerequisites: CHEM-135 or CHEM-137
This course provides a comprehensive introduction to the fundamental concepts of material science. Students will explore key topics such as chemical bonding and energy, the classification and properties of various materials—including metals, ceramics, polymers, and composites—and the mechanical properties that govern their behavior. The course will examine the mechanisms of material deformation and the influence of processing technologies on material performance and applications. Through a blend of theoretical principles and practical examples, students will develop a solid foundation in material science, preparing them for advanced study or careers in engineering and related fields.
Lecture: 4, Lab 0, Other 0

CHME-291 CHME Special Topics 4 Credits
Prerequisites: None
Lecture: 4, Lab 0, Other 0

CHME-310 Fluid Dynamics and Heat Transfer 4 Credits
Corequisites: CHME-200, CHME-325, MATH-203
Prerequisites: None
The application of fluid mechanics, phase transitions, and heat transfer in chemical engineering is demonstrated. Fluid studies including statistics, dynamics, friction losses, Newtonian and non-fluids, pumps, and metering of flows will be discussed. Mixing and agitation processes will be presented. Heat transfer processes, heat exchangers, evaporation and other heat transfer applications involving phase change will be discussed.
Lecture: 4, Lab 0, Other 0

CHME-325 Fluid Dynamics and Heat Transfer Lab 2 Credits
Corequisites: CHME-310
Prerequisites: None
This laboratory course demonstrates concepts in fluid mechanics and heat transfer as they relate to chemical engineering. Process measurements and the concepts of accuracy and precision are covered. Fluid static, dynamics, and metering of flows are explored. Experiments on heat conduction and convection are performed. Heat exchanger design and analysis are introduced. Computational topics include feed loop design and solutions of boundary value problems in momentum and heat transport. Finite element simulations are briefly explored.
Lecture: 0, Lab 2, Other 0

CHME-330 Mass Transfer and Separations 4 Credits
Prerequisites: CHME-210
An introduction to the applications of chemical engineering separation processes. Binary separations and multi-component separations including distillation, absorption, adsorption, leaching, drying, evaporation, extraction, membranes, filtration, and crystallization will be covered. Design of gas/liquid, liquid-liquid and liquid-solid separation processes will be discussed; methods covered include McCabe-Thiele methods, short-cut methods, sizing plate columns and packed columns, plate and column efficiencies, and mass transfer coefficient. Practical applications of mass transfer rates will be covered. Special topics including separation of azeotropes and combined separation units may be included.
Lecture: 4, Lab 0, Other 0

CHME-350 Reaction Engineering 4 Credits
Corequisites: CHME-210, MATH-204
Prerequisites: None
Concepts of reaction rates, stoichiometry and equilibrium will be applied to the analysis of chemical reacting systems, derivation of rate expressions from reaction mechanisms and equilibrium or steady state assumptions, design of chemical reactors via synthesis of chemical kinetics, transport phenomena, and mass energy balances. Topics covered include: batch, plug flow and continuously stirred reactors for chemical reactions and heterogeneous catalysis; and heat and mass transport in reactors.
Lecture: 4, Lab 0, Other 0

CHME-425 Separations, Reactions, and Prototyping Lab 2 Credits
Prerequisites: CHME-330 and CHME-350
This laboratory applies principles of reaction engineering and separations to the fabrication of a student-designed process. Topics covered include literature reviews, process safety, application and optimization of separation processes and reactors, process simulation, and design and fabrication of reactive and separation processes. Binary and multicomponent separation experiments include distillation, absorption, adsorption, filtration, and drying. Reaction engineering experiences include design of experiments to collect and regress reaction kinetic data and operation of batch and flow chemical reactors. This course will culminate in the demonstration of a student designed and built chemical engineering process.
Lecture: 0, Lab 3, Other 1

CHME-430 Process Controls 4 Credits
Prerequisites: CHME-330 and CHME-350
An understanding of the basic principles and methods underlying the steady state and dynamic characterization of chemical process control will be provided. This course introduces dynamic processes and the engineering tasks of process operations and control. Subject covers modeling the static and dynamic behavior of processes; control strategies; fundamentals and design of PID feedback, feed forward, cascade, and other control structures; controls equipment and instrumentation; statistical design of experiment; and process monitoring and statistical process control.
Lecture: 4, Lab 0, Other 0

CHME-440 Senior Chemical Engineering Design I 4 Credits
Prerequisites: ECON-201 and CHME-330 and CHME-350
Minimum Class Standing: Senior
This is the first of two advanced design courses incorporating core chemical engineering principles into the design of a plant. Topics related to plant design include optimization, plant economics and profitability, safety and environmental considerations, and ethics. Computer simulation tools will be used to aid in the designs. Three to four major designs will be completed in the form of design reports and oral presentations. Contemporary topics will be incorporated into the design projects.
Lecture: 4, Lab 0, Other 0

CHME-460 Sustainable Engineering Design: Energy and Environment 4 Credits
Prerequisites: CHEM-135 or CHEM-137
This course is designed to introduce students to the concepts involved in designing sustainable processes and products, while also focusing on applications related to energy and the environment. The first part of the course introduces the concept of sustainability and defines it in various contexts. It will explore the connections between industrial design and its impact on the environment, such as water and air quality. Concepts and principles to enhance environmental, social, and economic sustainability of engineering designs will be introduced. The final part of the course will explore topics in extended areas such as waste-to-fuel conversion, life-cycle analysis, and battery sustainable design, among others.
Lecture: 4, Lab 0, Other 0

CHME-470 Polymer Science & Engineering 4 Credits
Prerequisites: CHEM-135
This course will introduce students to basic polymer materials including plastics and elastomers; polymer structures, synthesis, properties, and characterization as well as processing technologies and applications. Students will also obtain hands-on experience on polymerization methods, polymer processing, and polymer characterization.
Lecture: 0, Lab 0, Other 0

CHME-472 Fundamentals - Battery Systems 4 Credits
Prerequisites: CHEM-135
The primary focus of this course is to explore the electrochemical principles and engineering behavior of various battery types, with a particular emphasis on lithium-ion batteries suitable for transportation applications. This course investigates the fundamental principles of battery systems and cutting-edge materials integral to lithium-ion batteries' design, development, and optimization. Students will explore the complexities of selecting, synthesizing, and characterizing materials, emphasizing improved performance, safety, and efficiency in lithiumbased energy storage systems.
Lecture: 4, Lab 0, Other 0

CHME-480 Chemical Engineering Capstone 4 Credits
Prerequisites: CHME-440
Minimum Class Standing: Senior
This is the second of two advanced courses incorporating ore chemical engineering principles into the design of a plant. Concepts built through the first semester course will be strengthened and applied to new design projects. Additional design topics including debottlenecking and troubleshooting will be introduced. Optimization to improve process performance and energy savings will be utilized and applied to course projects. Green engineering and environmental standards will be discussed as related to chemical engineering design. Students will complete large-scale industrial design projects in teams throughout the course. Finally, chemical product design concepts and strategies will be discussed.
Lecture: 4, Lab 0, Other 0

CHME-482 Alternative Fuels 4 Credits
Prerequisites: CHEM-135
This course offers a comprehensive introduction to both conventional and emerging energy sources, encompassing coal, crude oil, lithium-ion batteries, and hydrogen fuel cells. Students will investigate key topics, including internal energy, enthalpies of combustion, electrochemistry, and the various processing methods for fuels, such as distillation, cracking, fracking, and hydrogenation. The course will critically evaluate the advantages, limitations, and sustainability of different fuel types and energy sources. Through a combination of theoretical principles and practical examples, students will gain a robust understanding of fossil and alternative fuels, equipping them for advanced studies or careers in engineering and related fields.
Lecture: 4, Lab 0, Other 0

CHME-491 Chemical Eng. Special Topics 4 Credits
Prerequisites: None
An interdisciplinary advanced course focusing on a specific Chemical Engineering topic. This course is a one-time offering whose content is determined by current faculty interest, and provides a comprehensive and coherent examination of the chosen topic. This course may be repeated for credit under different topics.
Lecture: 4, Lab 4, Other 0

Chemistry (CHEM)

CHEM-135 Principles of Chemistry 3 Credits
Corequisites: CHEM-136
Prerequisites: None
This course introduces fundamental concepts and applications of chemistry, including atomic structure, the Periodic Table, chemical bonding, reaction stoichiometry, thermochemistry, ideal gas laws, and electrochemistry. Applied topics include batteries, fuel cells and corrosion, and a description of the chemistry and uses of metals and nonmetals are included.
Lecture: 3, Lab 0, Other 0

CHEM-136 Principles of Chemistry Lab 1 Credits
Corequisites: CHEM-135
Prerequisites: None
The laboratory introduces and/or illustrates chemical concepts and principles, and teaches the skills of data collection and evaluation. The SI system is emphasized.
Lecture: 0, Lab 1, Other 0

CHEM-137 General Chemistry I 3 Credits
Corequisites: CHEM-136
Prerequisites: None
An introduction to fundamental concepts of chemistry, including the Periodic Table, chemical nomenclature, reactions and reaction stoichiometry, atomic structure and chemical bonding. The course is open to all science majors, and is required for Chemistry majors. Non-science majors require permission of Chemistry Discipline Chair.
Lecture: 3, Lab 0, Other 1

CHEM-191 CHEM Special Topics 1-4 Credits
Prerequisites: None
Lecture: 0, Lab 0, Other 0

CHEM-223 Introduction to Polymer Science 4 Credits
Prerequisites: CHEM-135 or CHEM-137
Minimum Class Standing: Sophomore
An introduction to the fundamental principles of Polymer Science. Topics include the relationship between polymer structure and engineering properties with discussions of the most widely used polymeric materials and processes in terms of their relative costs, design parameters, and applications - thermal, mechanical, and rheological testing is discussed as well as the environmental impact of polymeric materials. Each lecture is augmented by displays of fabricated parts which illustrate general plastic selection principles. Each student makes an oral and written presentation which illustrates the application of polymer science to a specific material, design and/or process.
Lecture: 4, Lab 0, Other 0

CHEM-237 General Chemistry II 3 Credits
Corequisites: CHEM-238
Prerequisites: CHEM-135 or CHEM-137
Minimum Class Standing: Freshman 2
General Chemistry II, is a continuation of CHEM-137, General Chemistry I. Topics covered include: properties of gases, thermochemistry, chemical thermodynamics, ideal and non-ideal solutions, chemical equilibrium, chemical kinetics, nuclear chemistry, and electrochemistry.
Lecture: 3, Lab 0, Other 1

CHEM-238 General Chemistry II Lab 1 Credits
Corequisites: CHEM-237
Prerequisites: CHEM-135 or CHEM-137
Minimum Class Standing: Freshman 2
This laboratory course, taken concurrently with CHEM-237, is designed to continue exploring the experimental principles of chemistry not covered in CHEM-136. Topics covered include empirical formulas of hydrates, gas laws, heats of reactions, freezing point depression, iodine clock, acid dissociation constant determination, buffers, solubility product constant determination, electrolysis of water, and the determination of thermodynamic properties.
Lecture: 0, Lab 3, Other 0

CHEM-337 Materials Synthesis 4 Credits
Prerequisites: (CHEM-345 and CHEM-346)
This course introduces the industrial and laboratory methods of synthesizing a variety of materials such as semiconductors, complex ionic solids, metal-organic frameworks, and nanomaterials. These materials have applications in the fields of electronics, energy, sustainability, and medicine. Topics include 1) Industrial preparation of silicon wafers and semiconductor alloys; 2) Chemistry in the fabrication of microelectronics 3) Laboratory synthesis of complex ionic solids, metal-organic frameworks and nanomaterials. A variety of synthesis techniques will be discussed, such as high temperature solid state reactions, hydrothermal and sol-gel methods, ultrasound-assisted and microwave-assisted methods, and thin- film deposition methods. A strong laboratory component will augment lectures.
Lecture: 4, Lab 0, Other 0

CHEM-345 Organic Chemistry I 4 Credits
Prerequisites: CHEM-237
Minimum Class Standing: Sophomore
Terms Offered: Summer, Fall
A thorough coverage of the chemistry of hydrocarbons will be provided. Topics include: valence theory, stereochemistry, structure, addition polymerization, reaction mechanisms and spectroscopy. This course is appropriate for science majors and environmental Chemistry minors.
Lecture: 6, Lab 0, Other 0

CHEM-346 Organic Chemistry I Lab 2 Credits
Corequisites: CHEM-345
Prerequisites: CHEM-237 and CHEM-238
Minimum Class Standing: Sophomore
This laboratory develops the basic skills needed for the separation, identification and synthesis of organic compounds. Instrumental techniques introduced will include FTIR, UV-VIS, GC and GC/MS. One four-hour laboratory per week.
Lecture: 0, Lab 4, Other 0

CHEM-347 Organic Chemistry II 4 Credits
Prerequisites: CHEM-345
Minimum Class Standing: Sophomore 2
A continuation of CHEM-345 with an emphasis on the chemistry of the organic functional groups and the synthesis of polyfunctional molecules will be provided. Appropriate for science majors.
Lecture: 4, Lab 0, Other 0

CHEM-348 Organic Chemistry II Lab 2 Credits
Corequisites: CHEM-347
Prerequisites: CHEM-345 and CHEM-346
Minimum Class Standing: Sophomore 2
A continuation of CHEM-346 with an emphasis on the advanced techniques used to synthesize multifunctional organic compounds will be provided. Instrumental methods will be intensively utilized to characterize complex chemical structures.
Lecture: 0, Lab 4, Other 0

CHEM-351 Biochemistry I 4 Credits
Corequisites: CHEM-352
Prerequisites: CHEM-345 and CHEM-346
Minimum Class Standing: Sophomore
The basic principles of biochemistry will be the focus of this course. Coverage includes a thorough description of the biochemical framework - amino acids, proteins, enzymes, lipids, membranes, carbohydrates, nucleic acids, DNA, and RNA. In addition, the energetics and metabolism of a number of biological processes will be introduced.
Lecture: 4, Lab 0, Other 0

CHEM-352 Biochemistry Lab 3 Credits
Corequisites: CHEM-351
Prerequisites: CHEM-345 and CHEM-346
Minimum Class Standing: Sophomore
An introduction to biochemistry laboratory procedures for the separation and analysis of biologically important molecules. This course also covers techniques and methodology important in the biotechnology field.
Lecture: 0, Lab 3, Other 0

CHEM-361 Physical Chemistry I 4 Credits
Corequisites: CHEM-362
Prerequisites: CHEM-237 and CHEM-238 and PHYS-224 and PHYS-225
Minimum Class Standing: Junior
A first course in physical chemistry, covering the topics of chemical thermodynamics, gas laws, solutions, transport properties, phases and phase diagrams, electrochemistry, colligative properties and the physical chemistry of macromolecules.
Lecture: 4, Lab 0, Other 0

CHEM-362 Physical Chemistry I Lab 3 Credits
Corequisites: CHEM-361
Prerequisites: None
Minimum Class Standing: Junior
This laboratory will illustrate principles covered in the CHEM-361 lecture and introduce the student to methods used in determining physical relationships in nature. Topics include equilibrium, phase diagrams, solutions, thermodynamics, gases, transport properties and error analysis.
Lecture: 0, Lab 3, Other 0

CHEM-373 Analytical Chemistry 4 Credits
Corequisites: CHEM-374
Prerequisites: CHEM-237 and CHEM-238 and CHEM-345 and CHEM-346
Minimum Class Standing: Junior 2
Introduction to classical and modern instrumental analytical chemistry. The fundamentals of analytical statistics, acid/base calculations, titrations, basic chemical equilibrium, atomic and molecular spectroscopic, chromatographic, and electroanalytical methods of analysis will be covered.
Lecture: 4, Lab 0, Other 0

CHEM-374 Analytical Chemistry Lab 3 Credits
Corequisites: CHEM-373
Prerequisites: CHEM-345 and CHEM-346
Minimum Class Standing: Junior 2
This laboratory course covers the qualitative and quantitative analysis of chemical compounds including gravimetric, volumetric, and spectrophotometric methods.
Lecture: 0, Lab 3, Other 0

CHEM-437 Inorganic Chemistry 4 Credits
Corequisites: CHEM-438
Prerequisites: CHEM-345
Minimum Class Standing: Junior
In-depth coverage of the fundamentals of inorganic and bioinorganic chemistry, including structure and bonding of inorganic compounds, as well as their chemical periodicity and reactions. The descriptive chemistry of metals, non-metals and coordination compounds will also be discussed.
Lecture: 4, Lab 0, Other 0

CHEM-438 Inorganic Chemistry Lab 3 Credits
Corequisites: CHEM-437
Prerequisites: CHEM-346
Minimum Class Standing: Junior
This laboratory component is an introduction to the techniques used in the synthesis and characterization of metal complexes and organometallic compounds, including bioinorganic compounds. This course is open to all science majors and is required for chemistry majors. One three-hour laboratory per week.
Lecture: 0, Lab 3, Other 0

CHEM-451 Biochemistry II 4 Credits
Corequisites: CHEM-452
Prerequisites: CHEM-351 and CHEM-352
Minimum Class Standing: Junior 2
A comprehensive advanced Biochemistry lecture course. It will cover topics related to the biochemistry of the human body, including the breakdown and synthesis of glucose, fatty acids, amino acids, and nucleotides.
Lecture: 4, Lab 0, Other 0

CHEM-452 Biochemistry II Lab 3 Credits
Corequisites: CHEM-451
Prerequisites: CHEM-351 and CHEM-352
Minimum Class Standing: Junior 2
A comprehensive advanced Biochemistry laboratory. Topics related to the isolation and manipulation of DNA and proteins will be covered. Including techniques such as PCR, Western blotting, mutagenesis, DNA Fingerprinting, and molecular modeling.
Lecture: 0, Lab 3, Other 0

CHEM-494 Research Methods 4 Credits
Prerequisites: BIOL-242 or CHEM-238
Minimum Class Standing: Junior 2
Topics will include research ethics, study design and implementation, and results communications. Students will learn about these topics through readings, discussions, and practical application.
Lecture: 0, Lab 4, Other 0

Chinese Language (CHN)

CHN-101 Beginning Chinese I 4 Credits
Prerequisites: None
An introduction to speaking, reading and writing Chinese is provided. Students develop listening and conversational skills and learn to write and read Chinese characters. It covers basic Chinese grammatical structures and its usage. It also includes some discussion of Chinese culture as needed to understand the relationship between the language and the culture. Students are eligible to take this course only if they have less than one year of high school Chinese or less than one term of college Chinese (or by consent of the head of the Department of Liberal Studies). This course counts for Free Elective credit and cannot be substituted for any of the general education courses required of all students.
Lecture: 4, Lab 0, Other 0

CHN-102 Beginning Chinese II 4 Credits
Prerequisites: CHN-101
This course is the second in a three-part introduction to speaking, reading and writing Chinese. Students develop listening and conversational skills and learn to write and read Chinese characters. It covers basic Chinese grammatical structures and its usage. It also includes some discussion of Chinese culture as needed to understand the relationship between the language and the culture. Students are eligible to take this course only if they have less than two years of high school Chinese or less than two terms of college Chinese (or by consent of the head of the Department of Liberal Studies). This course counts for Free Elective credit and cannot be substituted for any of the general education courses required of all students.
Lecture: 4, Lab 0, Other 0

Communications (COMM)

COMM-101 Rhetoric & Writing 4 Credits
Prerequisites: None
This course prepares novice students to succeed at Kettering by introducing them to the expectations of college-level and professional communication. The primary goal of this course is for students to develop transferable knowledge of rhetorical composing practices. To achieve this goal, the course focuses on helping students acquire strategies for reading and writing critically, composing across genres and media, choosing appropriate research methodologies, and engaging in informed reflective practice. Assignments will focus on familiarizing students with rhetorical concepts such as genre, audience, purpose, occasion, and persuasive appeals, and asking them to apply these concepts through analyzing or composing for a variety of rhetorical situations.
Lecture: 4, Lab 0, Other 0

COMM-311 Rhetorical Principles of Persuasion 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || Theories of persuasion, techniques of argumentation, and the analysis of persuasive texts are covered. Topics include political speeches and campaign messages, rhetorical interpretation of advertising and business communication, and persuasive elements of popular culture. Verbal and visual elements of persuasion will be addressed. Students will apply these concepts by written analyses of persuasive texts and by composing and delivering persuasive speeches.
Lecture: 4, Lab 0, Other 0

COMM-313 Rhetorical Principles of Public Speaking 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || Understanding the processes and contexts of public speaking, including audience adaptation, principles of clear organization, development of ideas, and techniques of effective persuasive and informative speaking. Although the focus of the course is on analysis of great speeches throughout history, the course provides an opportunity for students to practice speaking about topics of current interests.
Lecture: 4, Lab 0, Other 0

COMM-314 Superheroes in Media and Culture 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || The costumed superhero has been a distinctive icon of American culture. Although often regarded as frivolous, unintellectual, and even childish, the popularity and reach of comic books superhero narratives makes them a valuable site of social critique, through examination of the ways they reflect, reinforce, or challenge the ideological positions of the culture that produces them. Consequently, this course makes use of superheroes and superhero stories to ask questions like: What makes a hero a superhero and a story a superhero story? Why are superheroes so popular in America? What do superhero stories tell us about ourselves? These questions serve the two primary goals of the course. First, to become familiar with the characteristics of the superhero narrative by engaging with and writing about a variety of literary and popular texts, tracing the figure of the superhero in narratives across an array of genres, from the novels and pulp fiction of the early twentieth century to the transmedia empires of today. Second, to explore some of the cultural issues and rhetorical functions communicated through and served by superhero narratives, particularly with respect to what they reveal about ideas like justice, power, and identity and issues of race, class, and gender.
Lecture: 4, Lab 0, Other 0

COMM-315 Film History: Style and Technology 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses The central concern of this course is how film has evolved as a medium from the silent era to the present. Students will study a number of significant movements and moments in the history of the medium, while considering the ways that technological developments have enabled changes in film style. Coursework includes two formal papers and a video essay.
Lecture: 4, Lab 0, Other 0

COMM-391 Communications Special Topics 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || An interdisciplinary advanced course focusing on a specific topic. This course is a one-time offering whose content is determined by current faculty interest, and provides a comprehensive and coherent examination of the chosen topic. This course may be repeated for credit under different topics.
Lecture: 4, Lab 0, Other 0

COMM-397 Communications Free Elective 4 Credits
Prerequisites: None
Lecture: 4, Lab 0, Other 0

COMM-401 Communicating about Data 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || Visualizations are powerful. Theories of visual rhetoric and design teach us that good visualization is not only clear and accurate but appealing as well. When executed well, visualizations enhance oral or written communication, by supporting arguments and claims, b providing insight into complex issues, and by supporting recall and decision-making in audiences. This relationship goes both ways, however, even well-crafted visualizations must be supported by effective oral and written communication. In this course, students explore both sides of this relationship, becoming familiar with common genres of visualization and with techniques both for designing them effectively and ethically, and for presenting visualizations orally and in prose.
Lecture: 4, Lab 0, Other 0

COMM-435 Written & Oral Communication for Overseas Students 4 Credits
Prerequisites: None
This course, intended for overseas students, seeks to heighten their awareness of American business communication practices. It will help develop a systematic approach to written and oral communication in the workplace. Topics include the nature of organizational communication and business writing, including techniques for writing letters, memoranda, proposals, and reports. Electronic communication practices are examined. Emphasis is also placed on professional communication skills in multicultural environments and relevant current events. This course does not receive credit in any Kettering University degree program.
Lecture: 4, Lab 0, Other 0

Computer Engineering (CE)

CE-210 Intro to Digital Systems Design 4 Credits
Prerequisites: ECE-101 or CS-101 or IME-211
Design and analysis techniques for combinational and sequential logic circuits are studied. Topics include binary number systems and binary addition/subtraction, combination logic minimization, frequently used combinational logic circuits, finite state machines, shift registers and counters. VHDL will be used for description, simulation and FPGA synthesis of digital circuits.
Lecture: 3, Lab 2, Other 0

CE-320 Intro to Microcomputers 4 Credits
Prerequisites: CE-210
Principles of microcomputer hardware and software are presented. Topics include instruction sets and addressing modes, structured assembly language programming, topdown design, introductory machine architecture and its relationship to programming, introduction to hardware in typical microcontrollers, and an introduction to programming microcontrollers in C.
Lecture: 3, Lab 2, Other 0

CE-412 Digital Systems Design 4 Credits
Prerequisites: CE-210
Minimum Class Standing: Junior
The principles and practices used in the design of modern complex combinational and sequential digital systems is covered. Digital logic design, analysis, simulation, and implementation techniques are provided. Fundamental algorithms underlying computer-aided design (CAD) tools are studied. Schematic diagrams and hardware description languages (HDL) are used to specify designs targeted for implementation in technologies ranging from discrete ICs to programmable logic devices and ASICs. The course has a laboratory component that allows students to exercise the principles and practices learned.
Lecture: 3, Lab 2, Other 0

CE-420 Microcomputer Systems 4 Credits
Prerequisites: CE-320
Minimum Class Standing: Junior
This advanced course in Microcomputer Systems covers the architectural features, design principles, development tools and techniques of advanced embedded microcomputers. The topics include architectures of contemporary 16-bit and 32-bit RISC microcontrollers (considering Microchip PIC24 and PIC32 as example cases for the practical development experiences), instruction set, addressing modes, software development & debugging, parallel and serial interfacing, interrupts, timer module, ADC module, etc. The course has a strong laboratory component, which will be carried out on a microcomputer development kit with the latest family of 16-bit and 32-bit microcontrollers.
Lecture: 3, Lab 2, Other 0

CE-422 Computer Architecture and Organization 4 Credits
Prerequisites: CE-320
Minimum Class Standing: Junior
The fundamental concepts in computer architecture and organization are presented. Laboratory assignments using VHDL simulation are a major portion of the course. Topics include fixed point and floating point computer arithmetic; assessing and understanding performance; control unit design; microprogramming; memory organization; cache design; a 32-bit instruction-set architecture; single-cycle, multicycle and pipelined CPU architectures; RISC architecture; examples of commercial computer architectures.
Lecture: 3, Lab 2, Other 0

CE-424 VLSI Design 4 Credits
Prerequisites: CE-320 and EE-210
Minimum Class Standing: Junior
Design techniques and basic theory of integrated circuit design are discussed. Topics include review of the semiconductor physics associated with NMOS and PMOS transistors; fabrication process; CMOS combinational circuits; memory cells; stick diagrams; layout techniques using CAD tools; circuit extraction and analysis. A project is completed.
Lecture: 3, Lab 2, Other 0

CE-426 Real-Time Embedded Systems 4 Credits
Prerequisites: CE-320
Implementation and applications of real-time embedded computers are studied. Topics include the case study of an embedded real-time operating system, typical applications of embedded computers, real-time hardware and software interfacing, and real-time scheduling algorithms. This course includes a lab component with several short design projects and a final directed design project.
Lecture: 3, Lab 2, Other 0

CE-442 Mobile Robotics 4 Credits
Prerequisites: CE-320
Minimum Class Standing: Junior
The fundamentals of robotics are covered with an emphasis on mobile robots, which are intelligent integrated mechanical, electrical and computational systems functioning in the physical world. Topics include state-of-the-art technologies in mobile robotics, such as locomotion, sensing, control, communication, localization, mapping, navigation, etc. Advanced topics such as coordination of multiple mobile robots will also be introduced. The course aims to provide both theoretical and practical experience to students through lectures and hands-on experience with real robots and simulation software.
Lecture: 3, Lab 2, Other 0

CE-450 App Dvelpmt for Mobile Devices 4 Credits
Prerequisites: CS-101 or ECE-101
This course is an overview of how to get started in developing mobile apps for Android and iOS platforms. These two app development platforms share similar challenges but have different approaches to addressing them. Both platforms will be taught to encourage students to see how the two different approaches can be used to solve similar issues. Students will choose one platform for their final design project. Topics include user interface design, network, communication, and sensor interfacing. This course includes lab components with design projects and final directed design project.
Lecture: 3, Lab 2, Other 0

CE-451 Introduction to Autonomous Driving 4 Credits
Prerequisites: CS-101 or ECE-101 or IME-211 or MECH-330
This course provides an overview of theoretical and practical background regarding the design and development of autonomous vehicles. Topics include an overview of autonomous vehicle systems, autonomous vehicle localization technologies, perception in autonomous driving, decision and planning, and control for autonomous driving. This course aims to cover the basics of autonomous driving through lectures, lab assignments, a term project, and readings on current related topics.
Lecture: 3, Lab 2, Other 0

CE-452 Artificial Intelligence for Autonomous Driving 4 Credits
Prerequisites: CS-101 or ECE-101
Minimum Class Standing: Junior
This course will provide introductory theories and technologies in artificial intelligence focusing on machine learning for autonomous driving. Machine learning studies algorithms that learn from large quantities of data, identify patterns and make predictions on a new data set. Students will study the concepts that underlie intelligent systems and investigate the advanced topics in intelligent systems. The first half of this course will focus on fundamental models and algorithms in intelligent systems. In the second half of the course, students will learn machine learning applications and programming skills by implementing the intelligent systems. Especially students will learn deep neural networks for identifying and classifying objects (vehicles and pedestrians) using data obtained from automotive sensors.
Lecture: 3, Lab 2, Other 0

CE-454 Computer Vision for Autonomous Driving 4 Credits
Prerequisites: CS-101 or ECE-101
This course will cover introductory theories and modern technologies in computer vision systems for autonomous driving. Data from visual sensors play crucial roles in many fields such as autonomous driving, surveillance camera, and robotics. The computer vision system seeks to automate tasks that the human visual system can do. The goal of this course is to learn technologies that enable a computer automatically to understand the content of visual sensors for autonomous driving. The first half of this course will focus on fundamental models and algorithms in computer vision and in the second half of the course students can learn about computer vision applications and programming skills to accomplish computer vision tasks.
Lecture: 3, Lab 1, Other 0

CE-472 VR Systems: Modeling & Control 4 Credits
Prerequisites: ECE-101 or CS-101 or IME-211
This course provides the required theoretical and practical background to design and development of multimodal virtual reality (VR) systems. Particularly, the main focus is on VR-based human-in-the-loop systems that enable users to interact and/or manipulate virtual objects in simulated environments. This course aims to cover basics of these systems through lectures, homework, lab assignments, a term project, and readings on current related topics. Through lab assignments, students acquire hands-on skills to create a multimodal virtual environment. Topics include multimodal virtual reality, current VR technology and devices, human-centered simulation: human perception and psychophysics, basic control and stability analysis of VR systems, and human factors in the design of VR displays.
Lecture: 3, Lab 2, Other 0

CE-480 Computer Networks 4 Credits
Prerequisites: CE-320 and MATH-258
Minimum Class Standing: Junior
Organization, analysis, and design of interconnected systems of computers are studied. Topics include the Open System Interconnection model and the Internet TCP/IP reference architecture. Standard protocols and technologies at each network layer will be covered, such as HTTP and a socket programming API at the application layer, TCP and UDP at the transport layer, and IPv4 and IPv6 along with fundamentals of routing at the network layer. Ethernet and Wi-Fi with their related physical mediums are discussed. The course will also introduce error detection and correction methods, basic network security principles and mobile technologies.
Lecture: 3, Lab 2, Other 0

CE-484 Internet of Things (IoT) 4 Credits
Prerequisites: CE-320
The most important topics of the Internet of Things and its applications will be addressed. Topics include an introduction to network stacks and embedded operating systems, IoT architecture models, smart devices, connections and access technologies, the IoT network layer, application layer protocols relevant to IoT, and IoT security practices. Various IoT application areas will be discussed, such as industrial, home automation, manufacturing, energy, utilities, vehicles, smart cities, agriculture and health care. Students complete a term project to develop a complete IoT application.
Lecture: 3, Lab 2, Other 0

CE-490 Senior CE Design Project 4 Credits
Corequisites: CE-422, CE-426
Prerequisites: ECE-101 and CE-420 and CE-480 and EE-320 and EE-321 and CS-102
Minimum Class Standing: Senior
Students are prepared for engineering practice through a major design experience based on knowledge and skills acquired in earlier course work. They work in teams to design and develop a prototype embedded-computer or other complex digital system to meet a given specification. The specification requires the design to incorporate relevant engineering standards and to address most of the following: manufacturability, sustainability, and economic, environmental, ethical, health and safety, social, and political considerations. Designs are documented in a professional manner and presented publicly.
Lecture: 2, Lab 4, Other 0

Computer Science (CS)

CS-100 Introduction to Programming & Computation 4 Credits
Prerequisites: None
This course provides an introduction to computer program development for students with little to no programming experience. Covers the fundamental constructs and patterns present in all programming languages including: variables and expressions, data and control structures, algorithms, debugging, program design, and documentation. Introduces algorithmic problem solving, computational thinking, and Python programming with applications in science and engineering. Introduces key concepts that will help you to learn how to be effective in any other language including: MATLAB, C, Java, Javascript or any other language that you might encounter. The course will have traditional weekly assignments as well as a project that will be based on the students' program of interest. A project bank will be available from which students can select their project built from contributions from a variety of disciplines.
Lecture: 3, Lab 2, Other 0

CS-101 Computing & Algorithms I 4 Credits
Prerequisites: None
An introduction to algorithmic problem solving, with emphasis on elementary program and software engineering techniques. Syntax and semantics of a modern programming language; programming and debugging at the file level; true object-orientation; Strings, arrays, sorting, and inheritance.
Lecture: 0, Lab 0, Other 6

CS-102 Computing & Algorithms II 4 Credits
Prerequisites: CS-101
A second course in algorithmic problem solving. Recursion, abstract data types, dynamic data structures, comparison-based sorting, elementary algorithm analysis, design of software projects of moderate size, and continuing development of programming skills.
Lecture: 3, Lab 2, Other 0

CS-203 Computing & Algorithms III 4 Credits
Prerequisites: CS-102 and CS-211
Minimum Class Standing: Sophomore
The design and analysis of advanced data structures and algorithms are covered. Topics include: algorithm design and analysis techniques, advanced data structures, advanced sorting, and applications to various problem domains.
Lecture: 3, Lab 2, Other 0

CS-211 Discrete Mathematics 4 Credits
Prerequisites: MATH-101 or MATH-101X or MATH-101H
Propositional and first-order logic; logical equivalence and inference are covered. Course topics include: proof techniques, mathematical induction and principle of diagonalization; set operations, relations, functions; introduction to graphs and trees and their applications to computer science; lattice structures and Boolean algebras; and truth tables and minimization of Boolean expressions.
Lecture: 4, Lab 0, Other 0

CS-231 Programming Language Paradigms 4 Credits
Prerequisites: CS-102
This course examines imperative and functional programming paradigms. Imperative paradigm topics include: data representation, dynamic structures, parameter passing, memory management, and I/O. Functional paradigm topics include: lists, first class and higher order functions, lazy evaluations, and infinite data structures.
Lecture: 3, Lab 2, Other 0

CS-300 The Computing Professional 4 Credits
Prerequisites: COMM-101 and (CS-102 or CE-210)
Minimum Class Standing: Sophomore
An examination of the profession of computing from historical and ethical perspectives. Overview of the history of computing, from the earliest computational devices and theoretical foundations to modern developments. Discussion of the social impact of computing on society and the ethical implications for computing professionals, including analysis of case studies.
Lecture: 4, Lab 0, Other 0

CS-304 User Experience and Interface Design 4 Credits
Prerequisites: CS-101 or ECE-101 or IME-211
This course will study the design and art involved in the User Experience and User Interface development process. Emphasizes hands-on development with a focus on Digital User Experience design and Interfaces using standard industry tools. Students will learn the process of research, user identification, empathize with end users, design from user requirements, and how to test their designs. Students will evaluate everything from popular website UX/UI, automotive displays, the User experience design process for physical products, and the challenging task of designing for interactive media. Students will go through the entire process of UX design from ideation to delivery of designs through a series of weekly project-based deliverables. Students develop multiple UX/UI solutions.
Lecture: 4, Lab 0, Other 0

CS-312 Theory of Computation 4 Credits
Prerequisites: CS-102 and CS-211
Minimum Class Standing: Sophomore
Topics covered in this course include: regular languages and grammars; finite-state machines and transducers; relationships between finite-state automata and regular languages; context-free languages and grammars; language recognition with stack machines and parsers; properties of formal languages; computability and undecidability; introduction to computational complexity.
Lecture: 4, Lab 0, Other 0

CS-320 Computer Graphics 4 Credits
Prerequisites: (MATH-101 or MATH-101X) and CS-102
Minimum Class Standing: Sophomore
This course is an introduction to computer graphics for game engines. This course will introduce shader programming languages, lighting, shadows, surface rendering, compute shaders, ray tracing, and sphere tracking. Providing a solid foundation to develop custom graphics and optimize existing graphics in the modern game engine Unity. Students will develop a series of projects to practice and solidify their knowledge.
Lecture: 4, Lab 0, Other 0

CS-341 Modern Web Applications 4 Credits
Prerequisites: CS-102
Terms Offered: Winter/Spring, alternate years
The skills and techniques to create dynamic web-based applications using World Wide Web programming methodologies are covered in this course. Topics include: front-end and back-end technologies, including the building blocks of the Web (HTML, CSS, the Document Object Model, JavaScript) and data exchange (HTTP, JSON, RESTful APIs, and SQL/NOSQL databases).
Lecture: 4, Lab 0, Other 0

CS-351 Cloud Computing 4 Credits
Prerequisites: CS-102
A comprehensive overview of cloud computing and its application such as big data and machine learning. Current technologies that comprise the concept of cloud computing are discussed. Exploration of major Cloud frameworks and their applications.
Lecture: 3, Lab 2, Other 0

CS-355 Introduction to Cybersecurity 4 Credits
Prerequisites: CS-101 or ECE-101 or IME-211
This course provides an overview of different aspects of cyber security. Students will be exposed to the spectrum of security activities, methodologies, attacks, hacking and defense mechanisms. Topics include: cybersecurity overview, security policy, application security, computer network attack and defense, data hiding, wireless security, cyber behavior analysis, authentication, access control, cryptography, cyber threats and their defense.
Lecture: 4, Lab 0, Other 0

CS-381 Ethical Hacking 4 Credits
Prerequisites: CS-101 or ECE-101 or IME-211
The course focuses on ethical hacking in a corporate environment and the ethics of attacking systems. A clear distinction will be presented between ethical and criminal hacking. Students will study various components & tools to secure systems from attacks by completing hands-on labs. The course will review various frames and tools to prevent unauthorized access through software and physical controls. It'll consist of various modules such as MITRE Frameworks (Concepts, Red team MITRE Attack, Blue team Detect, Purple team…), OSINT (Search Engines, Website/DNS/Wireless/Email… OSINT), Network Pen-testing (Layer 2 & 3 attacks, monitoring attacks, DNS attacks, Firewall), and Client Pen-testing (Server & Client-Side Exploits, Privilege Escalation, Remote Sniffing and Host based DNS Poisoning).
Lecture: 3, Lab 2, Other 0

CS-385 Elements of Game Design 4 Credits
Prerequisites: CS-102
This course will study the technology, science, and art involved in the creation and design of computer games. The course will emphasize the hands-on development of games and consider a variety of software technologies relevant to games. Throughout the course, students will learn the fundamentals of Narrative Design, Systems Design, and Level Design. Students will develop a strong foundation in the three primary design disciplines and be able to apply their knowledge directly to the game development process.
Lecture: 4, Lab 0, Other 0

CS-391 CS Special Topics 4 Credits
Prerequisites: None
Lecture: 4, Lab 0, Other 0

CS-415 Cryptography 4 Credits
Prerequisites: CS-102 and CS-211
Minimum Class Standing: Junior
A study of modern data security. Mathematical foundations of cryptography. Classical cryptographic systems and computer attacks on these systems. Cryptographic security over unsecure communication paths: cryptographic protocols, oblivious transfers, proofs of identity, signature schemes. Modern cryptographic systems: data encryption standards, public-key systems, key generation and management. External considerations are presented and discussed: security organizations role in security, privacy considerations, import/export issues.
Lecture: 4, Lab 0, Other 0

CS-420 Virtual Reality 4 Credits
Prerequisites: CS-102
This course covers the fundamentals of virtual reality (VR), also introducing extended reality (XR), augmented reality (AR), and mixed reality (MR). Topics include software development using a modern VR engine, stereo rendering, head-mounted displays, haptic feedback, motion tracking, etc.
Lecture: 3, Lab 2, Other 0

CS-425 Parallel Programming and Algorithms 4 Credits
Prerequisites: CS-231
Parallel computing has long played a vital role in addressing the performance demands of high-end engineering and scientific applications. Over the last decade, parallel computing has become important to a much broader audience as nearly all computer systems are being built using chips with multiple processor cores. The goal of CS-425 is to introduce students to the foundations of parallel computing including the principles of parallel algorithm design, analytical modeling of parallel programs, programming models for shared - and distributed - memory systems, parallel computer architectures, along with numerical and non-numerical algorithms for parallel systems. The course will include material on emerging multicore hardware, shared-memory programming models, message passing programming models used for cluster computing, data-parallel programming models for GPUs, and problem-solving on large-scale clusters using MapReduce. A key aim of the course is for students to gain a hands-on knowledge of the fundamentals of parallel programming by writing efficient parallel programs using some of the programming models learned in class. There will be different projects in CS-425 and CS-625. Students may not receive credit for both CS-425 and CS-625.
Lecture: 4, Lab 0, Other 0

CS-441 Foundations of Data Science 4 Credits
Prerequisites: CS-102
The concepts, principles, issues and techniques for big data and cloud computing are introduced in this course. This course will provide a foundation in data science based on data curation and statistical analysis. The primary goal of this course is to introduce data analysis concepts and techniques that facilitate making decisions from a rich data set. Students will investigate big data concepts, metadata creation, interpretation, and basics of information visualization.
Lecture: 4, Lab 0, Other 0

CS-451 Operating Systems 4 Credits
Prerequisites: CS-231
Operating system function and implementation; process and thread management, CPU scheduling and synchronization; real and virtual memory management, paging and page replacement algorithms, Case studies of historical and modern operating systems.
Lecture: 3, Lab 2, Other 0

CS-457 Wireless and Mobile Security 4 Credits
Prerequisites: CS-102
Terms Offered: Summer/Fall, alternate years
This course addresses the challenges of providing secure communication and network services in wireless and mobile environments. The focus of the course will be purely wireless and mobile environments such as wireless ad hoc, mesh, and sensor networks, as well as smartphones and mobile telecommunication systems.
Lecture: 4, Lab 0, Other 0

CS-458 Digital Forensics 4 Credits
Prerequisites: CS-102
This course will introduce students to the fundamentals of computer and network forensics and cyber-crime scene analysis including laws, regulations, international standards, and formal methodology for conducting computer forensic investigations. Emphasis will be placed on such advanced computer forensic science capabilities such as target hardening and software, tools for data duplication, recovery and analysis, and development of pre-search or on-scene computer investigative techniques.
Lecture: 3, Lab 2, Other 0

CS-461 Database Systems 4 Credits
Prerequisites: CS-102
Minimum Class Standing: Junior
Database design and implementation, entity-relationship model, relational model, object-oriented model, logical rules, relational algebra and logic, relational query languages, physical data organization, design theory for databases, distributed and Web-based databases.
Lecture: 4, Lab 0, Other 0

CS-465 Information Retrieval and Data Mining 4 Credits
Prerequisites: CS-102
Minimum Class Standing: Junior
Information retrieval and data mining topics, including information storage and retrieval, file structures, precision and recall, probabilistic retrieval, search strategies, automatic classification, automatic text analysis, decision trees, genetic algorithms, nearest neighbor method, and rule induction.
Lecture: 4, Lab 0, Other 0

CS-471 Software Engineering 4 Credits
Prerequisites: CS-102
Minimum Class Standing: Junior
Approaches and techniques for designing and developing large software systems. Software life cycles -- object-oriented and agile design techniques are emphasized. Requirements, specification, design, and documentation through design patterns and modeling languages. Software quality assurance, validation and verification. Security features designed into system. Project team organization and management. Students will work in teams on a substantial software project.
Lecture: 4, Lab 0, Other 0

CS-481 Artificial Intelligence 4 Credits
Prerequisites: CS-102
Topics covered include: Types of intelligence, knowledge representation, cognitive models. Heuristic and algorithmic techniques in problem solving, knowledge representation, reasoning under uncertainty and learning. Selected topics from natural language processing, vision processing, game playing, pattern recognition, speech recognition, robots, and other current topics in artificial intelligence. There will be different projects in CS-481 and CS-681.
Lecture: 4, Lab 0, Other 0

CS-482 Machine Learning 4 Credits
Prerequisites: CS-102
Minimum Class Standing: Junior
This course provides an introduction to machine learning. Topics include: supervised learning including generative, discriminative learning, parametric and non-parametric learning, neural networks, support vector machines; unsupervised learning including clustering, dimensionality reduction, kernel methods, learning theory bias/variance trade-offs, VC theory, large margins, reinforcement learning. The course will also include applications of machine learning to big data.
Lecture: 4, Lab 0, Other 0

CS-483 Algorithms for Deep Learning 4 Credits
Prerequisites: CS-102
Minimum Class Standing: Junior
This course provides students with the knowledge to implement the key algorithms related to deep learning. Deep learning is a branch of machine learning concerned with the development and application of modern neural networks. Deep learning is behind many recent advances in AI, including Siri's speech recognition, Facebook's tag suggestions, etc. Students will cover a range of topics including the foundational algorithms and data structures of neural networks, belief networks, generative learning models, convolutional and recurrent network structures, as well as overcoming issues with training and security. Graduate students will go into greater depth on certain topics and have additional readings and homework assignments, and a more complex project.
Lecture: 4, Lab 0, Other 0

CS-485 Advanced Game Development 4 Credits
Prerequisites: CS-102
This course covers advanced game development techniques to create interactive 3D video games using modern game engines. Topics include game artificial intelligence, collision detection, real-time physics, procedural generation, animation, visual effects, combat systems, etc.
Lecture: 3, Lab 2, Other 0

CS-498 Computer Science Study Abroad 4 Credits
Prerequisites: None
Advanced Topics in the Computer Science. This is a transfer course taken as part of Kettering's Study Abroad Program.
Lecture: 4, Lab 0, Other 0

CS-499 Computer Science Independent Study 4 Credits
Prerequisites: None
Terms Offered: As Decided
This course facilitates depth and breadth of study in a particular area of Computer Science. Students must request and receive approval of the independent study topic with the instructor.
Lecture: 4, Lab 2, Other 0

Economics (ECON)

ECON-201 Economic Principles 4 Credits
Prerequisites: None
Students are introduced to the economic way of thinking. Learn how individuals, firms, and societies make choices among alternative uses of scarce resources. A survey course, it covers both introductory microeconomics and introductory macroeconomics. The course combines applied theory and policy, and equips the student with the necessary tools to analyze and interpret the market economy.
Lecture: 4, Lab 0, Other 0

ECON-342 Intermediate Microeconomics: Managerial Economics 4 Credits
Prerequisites: ECON-201
Minimum Class Standing: Sophomore
Microeconomic theory will be combined with quantitative analysis to bring out essential features of managerial decision making. Microeconomic topics to be covered include demand and supply, elasticities, consumer behavior, production analysis, costs of production in the short-run and long-run, market structures, pricing practices, government regulation of business, and decision making under uncertainty. The course is application oriented and focuses on the relevance of microeconomic theory to solve business problems of the real world. Regression analysis and optimization methods are used to estimate and optimize microeconomic relations relevant to the revenue and cost structure of the firm such as demand, production, and cost functions. Statistical estimation and inference is facilitated by suitable statistical software.
Lecture: 4, Lab 0, Other 0

ECON-344 Intermediate Macroeconomics: Economic Growth and Fluctuation 4 Credits
Prerequisites: ECON-201
Minimum Class Standing: Sophomore
Macroeconomic theory and policy will be coved at the intermediate level. The determinants of GDP, inflation, unemployment, interest rates, and exchange rates are modeled. The sources of long run economic growth and business cycles are investigated. The effectiveness of government monetary and fiscal policy is evaluated. The course provides students with an understanding of the macroeconomic environment in which business and government decisions are made.
Lecture: 4, Lab 0, Other 0

ECON-348 History of Economic Thought 4 Credits
Prerequisites: ECON-201
Minimum Class Standing: Sophomore
The development of economic thinking will be analyzed by studying the work of preeminent economists and their schools of economic thought. The course helps the student understand contemporary economics and economic issues by studying how past thinkers viewed similar problems. Relevance of the great economic thinkers to contemporary economic issues is emphasized.
Lecture: 4, Lab 0, Other 0

ECON-352 International Economics 4 Credits
Prerequisites: ECON-201
Minimum Class Standing: Sophomore
This course offers the non-major in economics both the micro and macro components of international economics. It covers the theories and policies, as well as the institutional and historical contexts of the increasingly integrated international economy. By the end of the course, the student should be able to intelligently follow international economic issues and their impacts on national economies of various sizes. The student should also be able to explain patterns of a country's trade, analyze trade data of any country, and predict the consequences of alternative trade policies and of movement in the values of major international currencies. Topics covered include absolute and comparative advantage, relative factor endowments, intra-industry trade, tariffs and quotas, factor movements, balance of payments, exchange rates and foreign exchange markets, and international monetary arrangements.
Lecture: 4, Lab 0, Other 0

ECON-354 Money and Banking 4 Credits
Prerequisites: ECON-201
Minimum Class Standing: Sophomore
The course aims to provide the student with an introduction to the role of money, financial markets, financial institutions, and monetary policy in the economy. It will focus on the changing nature of money and the payments system as technology changes, the measurement of money, the role of the banking system in the creation of money and influencing the level of economic activity; the role of the central bank in regulating the banking system and pursuing monetary policy. The role of the financial system in linking investors and savers, providing information and reducing risk in the financing market will be emphasized.
Lecture: 4, Lab 0, Other 0

ECON-391 Economics Special Topics 4 Credits
Prerequisites: ECON-201
Minimum Class Standing: Sophomore
An interdisciplinary advanced course focusing on a specific topic. This course is a one-time offering whose content is determined by current faculty interest, and provides a comprehensive and coherent examination of the chosen topic. This course may be repeated for credit under different topic
Lecture: 4, Lab 0, Other 0

ECON-499 Economics Independent Study 4 Credits
Prerequisites: None
Advanced Level Economics Independent Study
Lecture: 4, Lab 0, Other 0

Elect. & Computer Engrg (ECE)

ECE-100 Principles of Electrical and Computer Engineering 4 Credits
Prerequisites: None
This is an introductory course that presents the basic principles of electrical and computer engineering. The topics include: basic circuit theory, electrical/electronic components, basic circuit laws and circuit analysis techniques; digital logic concepts, microcomputers, programming, and interfacing to digital & analog sensors and actuators. The course has a significant practical component that gives students the opportunity to apply tools for circuit design and simulation, printed circuit board (PCB) layout, and PCB soldering/assembly. Students will also work on mobile robots by interfacing sensors and developing programs for intelligent control of robots. At the end of the term students are expected to complete a comprehensive final project and write a report to demonstrate innovative application of the course material.
Lecture: 2, Lab 2, Other 0

ECE-101 MATLAB and C Programming 4 Credits
Prerequisites: None
The fundamentals of the MATLAB and C programming languages are covered. Special emphasis will be placed on using the tools acquired in this class to solve problems faced by electrical and computer engineers.
Lecture: 4, Lab 0, Other 0

ECE-291 ECE Special Topics 4 Credits
Prerequisites: None
Lecture: 0, Lab 0, Other 0

Electrical Engineering (EE)

EE-210 Engineering Circuit Analysis 1 4 Credits
Prerequisites: PHYS-224 and PHYS-225 and (MATH-102 or MATH-102H or MATH-102X)
This introductory course covers fundamental DC and AC circuit analysis techniques used by engineers to analyze and design electrical and electronic systems. Topics include circuit variables and components such as resistors, inductors, and capacitors, a thorough study of resistive circuit analysis techniques, and sinusoidal steady-state analysis and power calculations. The course introduces circuit simulation techniques to complement theoretical learning. The laboratory component emphasizes hands-on experience, enabling students to develop practical electrical measurement skills, apply electrical safety standards, and connect theoretical concepts to real-world circuit implementation.
Lecture: 3, Lab 1, Other 0

EE-240 Electromagnetic Fields and Applications 4 Credits
Prerequisites: PHYS-224 and PHYS-225
Basics of electromagnetic fields and applications are studied. Topics include: vector analysis; gradient, divergence, and curl; electrostatic fields; electrostatic boundary-value problems; magnetostatic fields; magnetic circuits; and Maxwell's equations for time-varying fields.
Lecture: 4, Lab 0, Other 0

EE-310 Engineering Circuit Analysis II 4 Credits
Prerequisites: EE-210 and (MATH-204 or MATH-204H)
Building upon the foundations laid in the introductory circuit analysis course, this second course delves deeper into both DC and AC circuit behavior, expanding students' ability to solve more complex circuits and design systems. This course focuses on techniques for analyzing linear circuits, including more sophisticated approaches to transient and steady-state analysis. Topics include: time-domain analysis of first- and second-order circuits, the application of Laplace transforms in circuit analysis, resonance, filters, and impedance in both frequency and time domains, along with an introduction to two-port networks and their applications. Students will also explore balanced three-phase circuits, magnetically coupled circuits, and power distribution. The course incorporates both theoretical analysis and practical design, with an emphasis on simulation tools for circuit modeling and analysis. By the end of the course, students will have a comprehensive understanding of the methods needed to solve real-world engineering problems in both analog and digital systems.
Lecture: 4, Lab 0, Other 0

EE-312 PCB Design & Testing 4 Credits
Prerequisites: ECE-101 and EE-320
Minimum Class Standing: Junior
This is a hands-on ECE class with focus on the design process for building printed circuit boards (PCBs). Students will select a design project from among a list of options, based on interest. The Altium Designer software will be studied and used to develop circuit schematics, a PCB layout, a Bill-of-Materials, and other fabrication files. The PCBs will be designed to interface with an Arduino Uno microcontroller board, serving as an “Arduino shield”. Upon receiving materials, students will build, test & verify their hardware. Students will then develop software for the Atmel ATmega328 microcontroller to operate their circuit and interact with it using a USB-Serial interface. The course will conclude with project demonstrations and a poster presentation open to all ECE students.
Lecture: 2, Lab 2, Other 0

EE-320 Introduction to Microelectronic Devices and Circuits 4 Credits
Prerequisites: EE-210
The basic building blocks used in electronic engineering are studied. The course introduces the fundamental principles and applications of electronic circuits and devices including operational amplifiers; semiconductor properties, pn junction diodes; MOS and bipolar devices; and basic transistor amplifier configurations. The laboratory component emphasizes hands-on learning, allowing students to apply theoretical knowledge to practical circuit design and analysis. By the end of the course students will have the ability to analyze and design basic discrete and integrated electronic circuits and be prepared for more advanced study in microelectronics.
Lecture: 3, Lab 1, Other 0

EE-325 Principles of Microelectronics Processing 4 Credits
Prerequisites: CHEM-135 and CHEM-136 and PHYS-224 and PHYS-225
This course covers the principles of semiconductor processing for modern integrated circuits for students studying within the engineering and material science disciplines. It begins with an overview of semiconductor devices, circuit families, and CMOS technology, which form the foundation of today's integrated circuits. Students will explore key topics such as process flow, crystal growth, semiconductor processing, thin film deposition, oxidation, etching, lithography, and clean room practices. Additionally, the course will introduce principles of manufacturing process control and modeling for manufacturability. Computer simulations will be extensively utilized where applicable. The course focuses on the processes involved in producing modern silicon-based, very large-scale integrated (VLSI) circuits. Time permitting, the course will also provide a brief introduction to processes used in the production of optical devices, nanotechnology, and microelectromechanical systems (MEMS), all of which are becoming increasingly important.
Lecture: 4, Lab 0, Other 0

EE-336 Continuous-Time Signals and Systems 4 Credits
Prerequisites: (MATH-204 or MATH-204H) and EE-210
Minimum Class Standing: Sophomore
Introductory continuous-time signals and systems are studied. Topics include: definitions and properties of signals and systems, convolution, differential equations, Laplace transform with applications, Fourier series, and Fourier transform of continuous-time signals with applications.
Lecture: 4, Lab 0, Other 0

EE-338 Discrete-Time Signals and Systems 4 Credits
Prerequisites: (MATH-204 or MATH-204H) and EE-210
Minimum Class Standing: Sophomore
Introductory discrete-time signals and systems are studied. Topics include: definitions and properties of signals and systems, sampling, convolution, difference equations, Z transform with applications, and the Fourier transform of discrete-time signals with applications.
Lecture: 4, Lab 0, Other 0

EE-340 Electromagnetic Wave Propagation 4 Credits
Prerequisites: EE-240
Advanced concepts of electromagnetic fields are studied. Topics include: propagation of uniform plane waves in various material media; transmission line analysis; electromagnetic wave propagation in waveguides; and antennas.
Lecture: 4, Lab 0, Other 0

EE-342 Electrical Machines 4 Credits
Corequisites: EE-310
Prerequisites: EE-210 and EE-240
Operating principles and design concepts of various types of electrical machines are studied. Topics include: magnetic circuits, single-phase and three-phase transformers; dc motors and generators; three-phase alternators; synchronous motors, induction motors and single-phase motors.
Lecture: 3, Lab 2, Other 0

EE-346 High Voltage Generation and Measurement Techniques 4 Credits
Prerequisites: EE-210 and EE-240
Insulation overvoltage-tests are studied. Topics include: generation of high, direct, alternating, and impulse voltages; voltage multiplier circuits; resonant test circuits; resistive, capacitive and mixed high-voltage dividers; sphere gaps; electrostatic voltmeters, Kerr Cell; and electrostatic coupling, interference, and grounding and safety.
Lecture: 3, Lab 2, Other 0

EE-348 Electromagnetic Compatibility 4 Credits
Prerequisites: EE-210 and EE-240
Issues involved in designing electrical and electronic systems to achieve electromagnetic compatibility are studied. Topics include: interference sources; government regulations limiting conducted and radiated omissions; electric and magnetic field noise coupling; grounding; filtering; shielding; electrostatic discharge; spectral analysis of electromagnetic interference; design methods for minimizing radiated emissions from digital circuits; and measurements of system emissions and susceptibility.
Lecture: 4, Lab 0, Other 0

EE-399 EE Independent Study 4 Credits
Prerequisites: None
Lecture: 0, Lab 0, Other 0

EE-410 eMobility System Analysis & Control 4 Credits
Prerequisites: ECE-101 and EE-210
Minimum Class Standing: Junior
This course will provide system analysis and design methods for electrified road vehicles. Firstly, the components and subsystems of electrified powertrain will be reviewed with real application design, including battery, electric motor and inverter etc. Modeling and simulation methods with MATLAB/Simulink will be covered for students to adopt multi-physical level model skills. With the knowledge of the systems, powertrain design basics will be reviewed, including hybrid/electric powertrain configurations, E/E architecture and energy management strategies. Finally, functional safety topics will be covered, including subjects and work products of road vehicle functional safety standard ISO-26262. System and function analysis methods, such as fault tree analysis (FTA), will be covered as well.
Lecture: 4, Lab 0, Other 0

EE-420 Electronics II 4 Credits
Prerequisites: EE-310 and EE-320
In this course, students will explore advanced principles of microelectronic circuit design, focusing on the core building blocks of modern integrated-circuit (IC) amplifiers and their application in analog VLSI systems. The course emphasizes the unique design philosophies behind ICs compared to traditional discrete circuits, with a primary focus on MOS and CMOS technologies, though BJT components will also be addressed. Key topics include integrated circuit biasing methods, differential and multistage amplifiers, high-frequency modeling, frequency response, and amplifier output stages. Through hands-on laboratory practice and experience with circuit simulation software, students will gain the skills necessary to validate and optimize microelectronic amplifier designs.
Lecture: 3, Lab 2, Other 0

EE-421 Energy Storage Systems with EV Applications 4 Credits
Prerequisites: EE-210 or EE-212
This course introduces the basics of energy storage systems. Several competing energy storage concepts and management systems will be considered with emphasis on rechargeable Li-ion batteries for EV applications. The course will focus on the fundamentals of Li-ion batteries with respect to the physical principles of operation, design, modeling and state estimation, as well as battery management systems.
Lecture: 4, Lab 0, Other 0

EE-424 Power Electronics and Applications 4 Credits
Prerequisites: EE-310 and EE-320
Electrical energy conversion principles, along with several powerelectronic devices and converter topologies are studied. Topics include: characteristics of diodes, thyristors, BJTs, IGBTs, and MOSFETs; transistor gatedrive circuits; operating principles of AC/DC, DC/DC and DC/AC converter circuits; isolation and isolated DC/DC converter circuits; power loss and efficiency calculations; high-frequency magnetic component design, and computer-aided analysis of the dynamic response of the converter circuits. Applications involving the dynamic representation and speed control of electric motors, together with power electronics, are also studied.
Lecture: 3, Lab 2, Other 0

EE-427 Semiconductor Device Fundamentals 4 Credits
Prerequisites: EE-320
Basic semiconductor theory for solid-state devices, diode theory, and applications of theory for transistors are studied. Topics include: energy bands, carrier statistics, equilibrium carrier concentrations, carrier transport, electrostatic devices, diode I-V characteristics, optical device applications, microwave device effects, and BJT, JFET, MESFET and MOSFET transistor models.
Lecture: 4, Lab 0, Other 0

EE-430 Communication Systems 4 Credits
Prerequisites: EE-310 and EE-320 and MATH-258 and (EE-336 or EE-338)
The study of methods used in electronic communication systems. Topics include: Fourier Transforms; analysis of distortion over a communication channel; autocorrelation of deterministic and random signals; energy and power spectral density; amplitude modulation; frequency modulation; phase modulation; digital line coding and modulation; communication circuitry.
Lecture: 4, Lab 0, Other 0

EE-432 Feedback Control Systems 4 Credits
Prerequisites: EE-310 or EE-336
Time and frequency domain representations of control systems are studied. Topics include: stability criteria; root locus methods; frequency response techniques, s-plane design methods. Design and evaluation of control systems are supplemented with computer aided control system design software.
Lecture: 3, Lab 2, Other 0

EE-433 Digital Control Systems 4 Credits
Prerequisites: EE-338 and EE-432
Minimum Class Standing: Senior 1
Control of continuous-time processes using computer-based controllers is studied. Topics include design of control algorithms for implementation, modeling of discrete time systems, application of z-transforms, stability analysis, root locus analysis, controller design via conventional techniques, state-space analysis and modeling, and design and implementation of digital controller. Implementation of real-time digital controllers is performed in the laboratory.
Lecture: 3, Lab 2, Other 0

EE-434 Digital Signal Processing 4 Credits
Prerequisites: ECE-101 and EE-338
Basic principles, design and applications of digital signal processing systems are presented. Topics include: review of discrete-time signals and systems, the z-transform, discrete-time Fourier analysis, the Discrete Fourier Transform, the Fast Fourier Transform, digital filter structures, FIR filters, and IIR filters. This course includes extensive use of MATLAB and experimental design projects using real-time signal processors.
Lecture: 3, Lab 2, Other 0

EE-443 Fundamentals of Power Systems 4 Credits
Prerequisites: EE-210
Basic structure of electrical power systems and characteristics of power transmission lines, transformers and generators are studied. Topics include: conventional and renewable energy resources for power generation, representation of power systems; symmetrical three-phase fault analysis; symmetrical components; unsymmetrical fault computations; and simulation tools and network analyzers.
Lecture: 3, Lab 2, Other 0

EE-444 Computational Methods in Power Systems 4 Credits
Prerequisites: EE-443
Matrix analysis of power system networks is studied. Topics include: power flow study of large scale interconnected power systems using Gauss-Seidel and Newton-Raphson methods; computer-aided short circuit analysis of large systems; economic operation of power networks; transient stability analysis; overvoltage calculations; and fundamentals of power system protection.
Lecture: 4, Lab 0, Other 0

EE-446 Vector Control of AC Electric Machines 4 Credits
Prerequisites: EE-240 and EE-310 and EE-320
Methods of controlling electric machines and their applications in electric vehicles are discussed. Topics include the theory of permanent-magnet and induction machines; coordinate-frame transformations; analysis and tuning of torque and speed control systems; modeling and dynamics of electric drives and vehicles, power-electronic devices, power-electronic circuits and switching schemes; rotor-flux oriented vector control; regenerative braking; and rotor-flux position-sensing methods. Machine and vehicle models will be developed using MATLAB Simulink. A low-voltage permanent-magnet machine and power-electronic inverter will be analyzed and tested.
Lecture: 3, Lab 2, Other 0

EE-482 Robot Dynamics and Control 4 Credits
Corequisites: EE-432
Prerequisites: None
Review of mathematical principle for robotics including matrix operations and their concepts. Principles of robot analysis, design, and operation are presented. Topics include review of historical robotics evolutions and applications, robot coordinate system placement rules, kinematic model development, kinematic solutions and analysis, trajectory planning and movement optimization, collision avoidance and path planning, feedback control system for robotics, feedforward, study of sensors for robotics applications, vision system types and application for robotics and mobile robots.
Lecture: 4, Lab 0, Other 0

EE-490 Senior Electrical Engineering Design Project 4 Credits
Prerequisites: CE-320 and EE-240 and EE-310 and EE-320 and (EE-336 or EE-338)
Minimum Class Standing: Senior
Students are prepared for engineering practice through a major design experience based on knowledge and skills acquired in earlier course work. They work in teams to creatively solve an open-ended engineering design problem and develop a prototype system to meet a given specification. The design will emphasize electrical engineering, but will be multidisciplinary. The specification requires the design solution to incorporate appropriate engineering standards with consideration of multiple constraints such as: public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. Designs are documented in a professional manner and presented publicly for a range of audiences.
Lecture: 2, Lab 4, Other 0

Engineering Physics (EP)

EP-235 Computers in Physics 4 Credits
Prerequisites: PHYS-224 and PHYS-225
Minimum Class Standing: Sophomore
The multiple ways computers are used by professionals in industry, academia, and government laboratories are provided. Problems in physics will be solved through analytical or symbolic software tools, numerical approaches implemented in spreadsheets and basic scripts written in a structured style, and experimental tools for control and data acquisition. This combination of symbolic, numerical and experimental work will give students a practical toolbox of techniques to solve new problems and meet challenges in upper level classes, graduate school, and/or postgraduate positions.
Lecture: 2, Lab 4, Other 0

EP-335 Computational Physics 4 Credits
Corequisites: PHYS-366
Prerequisites: PHYS-224 and PHYS-225
This course introduces foundational computational techniques that bridge the worlds of classical introductory physics and modern materials science. After introducing random walks and stochastic methods, Monte Carlo and molecular dynamics simulations introduce how macroscopic properties emerge from microscopic, many-particle systems. Similar methods can then be applied to find solutions to the Schrödinger equation of quantum mechanics. Finally, a survey of contemporary applications in materials science may include an introduction to density functional theory and current tools for predicting material properties from first principles calculations. Students will work with partially working code and many examples; prior programming experience is not assumed.

Lecture: 4, Lab 0, Other 0

EP-342 Introduction to Materials Science and Engineering 4 Credits
Prerequisites: PHYS-224 and PHYS-225 and (CHEM-135 or CHEM-137)
Minimum Class Standing: Sophomore
The course presents a general introduction to the relationship of structure and function in metals, ceramics, polymers, and semiconductors. Course content includes key elements relating to material structures, processes, and properties and the interrelation of these components. In addition, common materials characterization methods such as x-ray diffraction (XRD), optical microscopy, scanning electron microscopy (SEM), transmission of electron microscopy (TEM), scanning probe microscopy (SPM), and other applications in nanotechnology are introduced.
Lecture: 4, Lab 0, Other 0

EP-446 Solid State Physics 4 Credits
Prerequisites: PHYS-366
Minimum Class Standing: Junior
This course covers topics in physics of solids which are key to understanding solid-state electronics, including semiconductor devices. Students are introduced to the atomic structure of matter through the study of crystal structure and x-ray diffraction. Starting with the classical model of conduction in metals, concepts of quantum physics are used to derive the free-electron quantum model of metals, band theory of metals, and band theory of semiconductors. Students will be introduced the concept of Brillouin zones, electronic density of states, energy band gaps, Bloch functions, effective mass, holes, Fermi surfaces, semiconductor, and pn junctions. The aforementioned topics and concepts are used to explain some of the widespread applications of solid-state physics, such as diodes, bipolar junction transistors, and field-effect transistors. Other topics in solid- state physics may be covered as time permits or as requested by students.
Lecture: 4, Lab 0, Other 0

EP-485 Acoustic Testing and Modeling 4 Credits
Prerequisites: (MATH-204 or MATH-204H) and PHYS-302
This course combines testing and measurement in the Acoustics Laboratory, modeling approaches including the finite element method, and exposure to textbook and journal literature to explore basic phenomena in acoustics. Each time the course is offered, students and the instructor will select two modules from a larger set, so that the course may be tailored to meet the needs and interests of students and faculty. Module topics include acoustics oscillators, structural vibration, source models, three-dimensional wave propagation, impedance and intensity, and transducers. Additional modules may be offered. Students in this course will collaborate to develop understanding through lab work, modeling, and theory. Each module will culminate in a presentation.
Lecture: 2, Lab 4, Other 0

History (HIST)

HIST-306 International Relations 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || A study of the central issues and problems in the history of modern international relations. This course will explore such issues as the connection between the First World War and the Second World War, the impact of the policies of great powers on conflicts in the non-western world, and the causes and consequences of the Cold War. This course will also examine the rise of international organization, the expansion of Western power, and the acceleration of global interdependence.
Lecture: 4, Lab 0, Other 0

HIST-308 America and the World 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || A study of the central issues and problems in the history of America's relations with the larger world. This course will examine such topics as American independence and expansion, the Civil War and the "new empire", the Spanish-American War, American involvement in the First World War, U.S. foreign relations in the interwar period, American involvement in the Second World War in the Pacific and Europe, The Cold War, the impact of the U.S. in Latin America, Asia and Africa, and American foreign relations since 1989.
Lecture: 4, Lab 0, Other 0

HIST-319 The Rise of the Global Community 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || A study of the central issues and problems in the history of international organizations and the rise of the modern global community. This course will give particular attention to the past, present, and future of the United Nations in world politics. It will explore such topics as the legacy of the League of Nations, the development of international law, and the nature of human conflict and conflict resolution. Using case students, the primary and secondary sources, as well as simulations of the activities of international organizations, students will examine and debate such contemporary issues as arms control, human rights, war crimes, international terrorism, collective security and peacekeeping, humanitarian intervention, global threats to human health and the environment, and the use of science and technology fro human development.
Lecture: 4, Lab 0, Other 0

HIST-320 Modern Middle East 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || The history of the Middle East from World War I to the Gulf War of 1991 will be surveyed. It focuses on the Arabic-speaking areas of the former Ottoman empire, Turkey, Iran, and Israel. Thematically, the course explores major themes in Middle East history; the rise of nationalism and formation of nation-states; economic development strategies of the new states and formation of new social classes; the impact of Israeli and Palestinian nationalism and conflicts; oil and politics; the Islamic Revolution in Iran, and the Gulf War. The course also examines the impact of outside powers on the region; problems of political, economic, and cultural decolonization; and efforts to reassert Islamic identity in an era of tightening globalization. Considerable attention will be devoted to the region since 1945 and to the problems and promises of the present day.
Lecture: 4, Lab 0, Other 0

HIST-322 Africa in the World Economy 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || Africa's involvement in the changing world economy and its role in the contemporary world will be examined. Its goal is to provide students a framework for understanding Africa's contemporary economic challenges and opportunities. The course begins by examining the political, social and economic history of the continent since independence, focusing on how the lack of visible material and social progress in the post-independence period framed popular perceptions about Africa. The role of external players and ideas and the nature of local initiatives and responses in shaping Africa's place in the world economy will also be examined.
Lecture: 4, Lab 0, Other 0

HIST-329 Science, Technology, and the Modern World 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course will examine the political, economic, social, and cultural consequences of science and technology over the past 500 years as well as consider how science and technology have contributed to some of the most important ethical problems of the modern age. This course will explore such topics as the scientific, commercial, and industrial revolutions; the technologies of imperialism and the expansion of Western power; the roles of science and technology in the First World War and the Second World War; the influences of scientific and technological developments on the rise of modernism, consumerism, and globalization; the impact of science and technology on human health and the environment; and the changing interactions between humans, materials, and machines over time. It also aims to raise questions about the myths, promises, and perils of science and technology for contemporary society as well as the meaning of "progress" and the making of "a better world" through scientific and technological innovation.
Lecture: 4, Lab 0, Other 0

HIST-391 History Special Topics 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || An interdisciplinary advanced course focusing on a specific topic. This course is a one-time offering whose content is determined by current faculty interest, and provides a comprehensive and coherent examination of the chosen topic. This course may be repeated for credit under a different topic.
Lecture: 4, Lab 0, Other 0

HIST-499 History Independent Study 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course facilitates depth and breadth of study in a particular area of History. This course may not serve as a substitute for any of the courses in the general education component, including the Social Science elective and senior seminar. Students must request and receive approval of the independent study topic with the instructor and the Head of the School of Foundational Studies.
Lecture: 4, Lab 0, Other 0

Humanities (HUMN)

HUMN-380 Anticipating Futures: Technology, Nature, Society 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || As we "make things work," what kind of world are we making? This environmental humanities course uses technology as a form of inquiry to explore patterns and revolutions in human thought, identify the ways in which societies become organized, and imagine and prepare for a sustainable, just future. Course questions include: What is technology and what is it for? To what extent does technology affect consciousness? How does technology and speed affect humans' relationship with each other and the natural world? Do technological artifacts have a politics and an ethics? How might we rethink our relation to energy to further equitable, sustainable practices and climate resilience? How does technological design both shape and become shaped by the way we imagine and choose to design societies? Ultimately, this course encourages students to integrate knowledge of historical, cultural, and social contexts to reflect on how to further a sustainable present and future.
Lecture: 4, Lab 0, Other 0

HUMN-391 Humanities Special Topics 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || An interdisciplinary course focusing on a specific topic. The purpose of the course is to bring to bear on one geographical area, historical era, artistic movement, or cultural phenomenon the perspectives of several disciplines within the humanities, thus providing a comprehensive and coherent examination of the chosen topic. This course may be repeated for credit under different topics.
Lecture: 4, Lab 0, Other 0

HUMN-499 Humanities Independent Study 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course facilitates depth and breadth of study in a particular area of the Humanities. This course may not serve as a substitute for any of the courses in the general education component, including the Humanities elective and senior seminar. Students must request and receive approval of the independent study topic with the instructor.
Lecture: 4, Lab 0, Other 0

Indust/Manufctrng Engrg (IME)

IME-100 Interdisciplinary Design and Manufacturing 4 Credits
Prerequisites: None
This introductory class exposes students to basic design principles, the materials of manufacture, their structure and properties, and methods of processing them into everyday products. The laboratory provides hands-on experience in many of these processes, as well as electromechanical design and computer-aided manufacturing.
Lecture: 2, Lab 4, Other 0

IME-200 Introduction to Industrial Engineering 4 Credits
Prerequisites: None
This course introduces students to industrial engineering and provides students with foundational tools used in the profession. The course is intended to prepare students for co-op experiences in industrial engineering by exposing them to tools and concepts that are often encountered in practice. The course covers specific tools and their applications, including systems design and integration. The course uses a combination of lecture and active learning. Projects and group exercises will be used to cover hands-on applications and problem solving related to topics covered in lectures.
Lecture: 4, Lab 0, Other 0

IME-211 Algorithms and Computer Programming 4 Credits
Prerequisites: None
This course introduces students to application-oriented algorithm development and structured programming using python and visual basic. Students will be exposed to various programming methodologies, IDEs, input/output scripting, and data structures with a focus on designing, developing, testing, and implementing algorithms to solve problems in operations and supply chain, intelligent manufacturing, and other industrial engineering disciplines.
Lecture: 3, Lab 2, Other 0

IME-300 Manufacturing Processes 4 Credits
Prerequisites: IME-100
This introductory course in manufacturing processes and analysis. Topics include engineering drawing with CAD/CAM, material properties, casting, metal forming, polymer processing, welding, and machining. This course aims to explore conventional manufacturing processes and an introduction to advanced techniques, such as additive manufacturing and nontraditional machining, and Industry 4.0. The laboratory component further enhances learning by providing hands-on experience, where students collaborate in teams to utilize these processes for manufacturing parts.
Lecture: 3, Lab 2, Other 0

IME-321 Operations Research - Deterministic Models 4 Credits
Prerequisites: IME-200
This course introduces the students to mathematical modeling and quantitative methods and techniques for effective decision—making. In this course, the students learn how to formulate, analyze, and solve mathematical models that represent real-world problems. Topics include deterministic systems optimization; review of linear algebra, linear programming, sensitivity analysis, transportation network models, assignment problems, integer programming, and introductory topics in nonlinear programming.
Lecture: 4, Lab 0, Other 0

IME-332 Engineering Statistics 4 Credits
Prerequisites: MATH-258
Minimum Class Standing: Sophomore 2
This course introduces the students to statistics applications in engineering. Topics include exploratory data analysis, sampling methods, inferential statistics for one and two population cases, goodness of fit tests, regression analysis and non-parametric statistics. Statistical software such as Minitab is used throughout the course.
Lecture: 4, Lab 0, Other 0

IME-351 Engineering Economics 4 Credits
Prerequisites: MATH-101 or MATH-101X
Minimum Class Standing: Sophomore
This is an introductory course on economic and financial analysis to assist engineers in making fiscally sound decisions. Topics include time value of money and financial measures such as return on investment, break-even analysis, replacement analysis, inflation, depreciation, and taxes.
Lecture: 4, Lab 0, Other 0

IME-361 Lean Work Design 4 Credits
Prerequisites: MATH-258
Minimum Class Standing: Sophomore
Teams of students design and implement a complex assembly production system. Through application of lecture concepts in the "Lego Lab", a fundamental understanding of work design and performance improvement concepts, tools, and techniques is provided. Topics covered include applied anthropometry, charting techniques, work methods and waste analysis, performance measurements and learning curves, workplace organization and visual controls, work standards, and human factors issues related to manual assembly systems.
Lecture: 3, Lab 2, Other 0

IME-403 Computer Numerical Control Machining 4 Credits
Prerequisites: IME-100
Minimum Class Standing: Junior 2
This course introduces the fundamentals of computer numerical control (CNC) programming and computer-aided manufacturing (CAM) are introduced. The fundamental theoretical and operational concepts of machining are also presented. The course focuses on the programming of cutting operations; tool materials, selection, and uses. Topics include G-code programming, Introduction to CAM software, Taylor's tool life model, Criteria for tool selection, and the Orthogonal Cutting Model. Laboratories use CNC machine tools for programming and cutting, and are designed to illustrate theoretical concepts and methods for solving practical engineering machining problems.
Lecture: 3, Lab 2, Other 0

IME-408 Industrial Robotics 4 Credits
Prerequisites: IME-100
Minimum Class Standing: Junior 2
Basic concepts of robotic system theory and applications are presented. Human and robotic system interface with diverse real environments are discussed. Human and robotic safety is stressed. Advantages, limitations, business case justifications of investment, and benefits of robotic systems for lean and quality operations are emphasized. Flexible manufacturing operations, work cell design, cycle time, work path, end-effectors, and collaborative robots are covered. Both hands-on and simulation of industrial robotic systems are included.
Lecture: 3, Lab 2, Other 0

IME-412 Applied Control Systems Design 4 Credits
Prerequisites: IME-100 and (IME-211 or ECE-101 or CS-101)
Minimum Class Standing: Junior 2
A course designed to introduce students to various computer-controlled systems used for industrial automation including data collection, analysis and reporting. Various hardware, software, sensors, and human resources required to implement effective control systems will be studied. Students will be engaged in hands-on laboratory exercises requiring them to configure and write programs and design systems to solve various assigned problems through individual and/or group efforts. Modern techniques for Industry 4.0 such as data management for predictive maintenance and artificial intelligence will also be explored.
Lecture: 3, Lab 2, Other 0

IME-414 Design for Manufacturing and Assembly 4 Credits
Prerequisites: IME-300
This course aims to provide an in-depth understanding of the complex interrelationships between design and manufacturing. It covers essential topics, principles, and practices of Design for Manufacturability and Assembly, with a focus on the product development process, customer requirements, design requirements, robust design, manufacturability, assembly, and design for Misc (DOX), as well as designed experiments (DOE) and GD&T. In DFMA, the students will learn about assembly documentation, constraint analysis, variation, sequence analysis, concurrent engineering, and how to efficiently model assembly systems. Students will be expected to work in small teams, apply methods they learn, and present results and conclusions based on assigned work to practice being part of a project team.
Lecture: 4, Lab 0, Other 0

IME-416 Additive Manufacturing 4 Credits
Prerequisites: IME-100
Additive Manufacturing (AM), commonly known as 3D printing, involves creating three-dimensional objects directly from computer-aided designs (CAD) by adding material layer by layer. In this course, students will gain a comprehensive understanding of AM processes, design principles for AM, materials selection, and reverse engineering techniques. The course will explore how AM drives innovation in different industries, such as automotive, aerospace, and healthcare. Through laboratories, students will gain hands-on experience with advanced CAD for AM, SLA, FDM, reverse engineering, and tackling real-world challenges.
Lecture: 3, Lab 2, Other 0

IME-422 Simulation 4 Credits
Prerequisites: MATH-258
This course covers modeling of dynamic systems and uses virtual and discrete event simulation (DES) to analyze engineering design problems. Students use modern simulation software to practice the applications in production/manufacturing/service and other areas related to Industrial and Manufacturing Engineering.
Lecture: 4, Lab 0, Other 0

IME-452 Production System Design 4 Credits
Corequisites: IME-351
Prerequisites: IME-321 and MATH-258
Minimum Class Standing: Junior
Students gain an understanding of the application of industrial engineering theory and practice to the area of operations management and production planning/control. Topics include analysis and understanding of demand forecasting, aggregate planning, operations strategy, capacity planning, materials requirement planning, inventory management, scheduling, and sequencing.
Lecture: 4, Lab 0, Other 0

IME-453 Supply Chain Design 4 Credits
Prerequisites: IME-452
This course introduces principles of supply chain and logistics network from an engineering perspective. Students gain an understanding of the decision-making process required to design and manage the global supply chain. The key concepts such as inventory planning, warehousing, logistics and distribution networks, facility location planning, probabilistic project management, and sustainability are covered in this course.
Lecture: 4, Lab 0, Other 0

IME-454 Senior Design Project 4 Credits
Prerequisites: None
Minimum Class Standing: Senior II
This course provides the student with the challenge of integrating and synthesizing general engineering knowledge, particularly in industrial and manufacturing disciplines. Students apply the engineering design process to creatively solve real-world, open-ended problems in a team setting. The course is intended to be taken in the students' final term on campus.
Lecture: 4, Lab 0, Other 0

IME-462 Ergonomics 4 Credits
Prerequisites: MECH-210 and MATH-258
Human factors and ergonomics concepts for design of work. Topics include functional anatomy, bio-mechanical analysis of physical work, work physiology, manual material handling, cumulative trauma disorders, hand tool design, and human factors related to applied job design.
Lecture: 3, Lab 2, Other 0

IME-463 Safety and Human Factors 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
An introduction to occupational safety; including injury statistics, mandatory and voluntary specification and performance regulations, standards, and guidelines. Electrical, machine, fire and life safety, confined spaces, and fall hazards (among others) are discussed in the context of traditional safety and human factors engineering. Students apply systems safety analysis methods in real-world hazard analysis and control projects.
Lecture: 4, Lab 0, Other 0

IME-464 Cognitive Work 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
This course is designed to serve as an introduction to the field of Cognitive Psychology/Cognitive Work. It will introduce students to methods and applications that have been used to investigate brain processes and their functions. It will address concepts, theories, methods, and researching findings in human information processing, particularly as they relate to attention, perception, memory, problem solving, decision making, language, and reasoning.
Lecture: 4, Lab 0, Other 0

IME-465 Human-Computer Interaction and Interface Design 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
This multidisciplinary course provides theoretical and practical skills that are needed to design, develop, and evaluate human interaction with computer and machine interfaces and virtual environments. Course topics are anchored around fundamental cognitive human capabilities and their relationship to product design and testing. Example topics include human psychological capabilities, rapid prototyping, usability testing, and experimental evaluation of input devices. Students employ the user-centered design process with hands-on experimentation and evaluation in a term design project. This course is multidisciplinary, so students from all majors are encouraged to participate and programming skills are not required.
Lecture: 4, Lab 0, Other 0

IME-471 Quality Control 4 Credits
Prerequisites: MATH-258
Minimum Class Standing: Junior
The basics of modern methods of quality control and improvement that are used in the manufacturing and service industries are covered in this course. It includes quality philosophy and fundamentals, statistical methods of quality improvement, concept of variation and its reduction, control charts, and Statistical Process Control (SPC). Deming's quality and management concepts will also be discussed.
Lecture: 4, Lab 0, Other 0

IME-473 Design of Experiments 4 Credits
Prerequisites: MATH-258
Minimum Class Standing: Junior
The objective of the course is for students to develop the skills necessary to plan an experiment, collect the data, and analyze the results to improve quality, efficiency, and/or performance of working systems/products. Variable selection process, ANOVA, factorial designs, fractional factorial designs, blocking, and response surface methodology are covered. Statistical software such as Minitab is used extensively throughout the course.
Lecture: 4, Lab 0, Other 0

IME-476 Lean Six Sigma 4 Credits
Prerequisites: MATH-258
Minimum Class Standing: Senior
Techniques to maximize production efficiency and maintain control over each step in the process are examined in this course. The structured problem-solving methodology DMAIC (Define-Measure-Analyze-Improve-Control) will provide the framework for the course. This course provides a strong foundation for future Six Sigma certifications.
Lecture: 4, Lab 0, Other 0

IME-484 Engineering Ethics 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
The professional and ethical consideration of an engineer in contemporary society is covered in this course. Discussions include the code of ethics for engineers, case studies on conflict of interest, teamwork, engineering/management responsibilities, government regulations, environmental and societal considerations and professional registration. This class requires live weekly discussion.
Lecture: 4, Lab 0, Other 0

IME-498 Industrial Engineering Study Abroad 4 Credits
Prerequisites: None
Advanced Topics in Industrial Manufacturing Engineering. This is a course taken as part of Kettering's Study Abroad Program.
Lecture: 4, Lab 0, Other 0

IME-499 Industrial Engineering Independent Study 4 Credits
Prerequisites: None
This course facilitates depth and breadth of study in a particular area of Industrial Engineering. Students must request and receive approval of the independent study topic with the instructor.
Lecture: 4, Lab 0, Other 0

Integrated Learning Exp (CILE)

CILE-101 First Year Foundations 1 Credits
Prerequisites: None
Critical information will be provided on personal, academic and professional development for first-year students. Class discussions will support student engagement in the Kettering community, help make important connections for students to develop a sense of self-governance, and set a foundation for both critical thinking and reflective learning mindset. Students will learn to interact in the academic and cooperative work environments successfully. Mentoring and interaction with the instructors will provide support and guidance for students to be fully integrated into Kettering University. Discussions and assignments will enhance student transition and acclimation to Kettering University.
Lecture: 1, Lab 0, Other 0

CILE-400 Undergraduate Thesis Initiation 0 Credits
Prerequisites: None
The Kettering University senior thesis is an individual culminating project (or portion of a project) completed and documented by the Kettering undergraduate student, providing an opportunity for the student to apply academic and experiential learning to a real-world issue. The thesis is guided by the student's co-op employer or a university research faculty member. This project is completed over a two to three term period at the co-op workplace and/or on campus.
Lecture: 0, Lab 0, Other 0

CILE-401 Undergraduate Thesis Completion 4 Credits
Prerequisites: None
The Kettering University senior thesis is an individual culminating project (or portion of a project) completed and documented by the Kettering undergraduate student, providing an opportunity for the student to apply academic and experiential learning to a real-world issue. The thesis is guided by the student's co-op employer or a university research faculty member. This project is completed over a two to three term period at the co-op workplace and/or on campus.
Lecture: 0, Lab 0, Other 0

CILE-490 Multidisciplinary Capstone 4 Credits
Prerequisites: None
Minimum Class Standing: Senior 1
This course challenges multidisciplinary teams of students to integrate and synthesize general engineering and/pr science knowledge in a comprehensive design experience focusing on a project with direct application to a real world, open-ended problem. This course fulfills the requirement of a student's degree department Senior (Engineering) Design/Capstone, Technical Elective or Free Elective.
Lecture: 4, Lab 0, Other 0

CILE-499 On-Campus Experiential Learning 1 Credits
Prerequisites: None
The purpose of this one-credit course is to allow a student to earn credit for extraordinary and outstanding contribution to an on-campus experiential learning opportunity through an extracurricular activity. The following requirements/limitations apply: 1) This course is not to be used as an independent/self-directed study for an individual student; credit may be given for outstanding contribution to an extra-curricular endeavor that involve an established (or emerging) student group/ organization operating under the supervision of a project/activity advisor; 2) Registration is by an application form approved by the project/activity advisor and their respective department supervisor (e.g. faculty advisor and their department head); 3)Application should state the desired course title (default: On-Campus Experiential Learning), the designated course instructor (i.e. project advisor), a description of the activity, and a set of criteria that establish the standard for outstanding contribution; 4) A student may apply for a maximum of one (1) CILE-499 credit per term; 5) A maximum of four (4) CILE-499 credits may be counted as "free-elective" credits toward graduation requirements; 6) Grading is based on S/U as assigned by the project/activity advisor in accordance with the criteria stated on the application form.
Lecture: 0, Lab 0, Other 0

Language (LANG)

LANG-297 LANG Elective 4 Credits
Prerequisites: None
This is a Language Transfer Course recording credit for students transferring to Kettering University for a course in foreign languages (including Sign Language). The course is transfer only, and will never be listed in term course offerings.
Lecture: 4, Lab 0, Other 0

Liberal Arts (LA)

LA-489 Senior Seminar: Leadership, Ethics, and Contemporary Issues 4 Credits
Prerequisites: LA-201 or LS-201
Minimum Class Standing: Senior
This course examines the interrelated subjects of leadership, ethics and contemporary issues. Because it is a culmination of their general education, students in this course use the methods and perspectives learned in the preceding general education courses. After examining general theoretical approaches through a common text, the course will involve three case studies with suitable assigned readings. One case study will focus on a corporation in order to illustrate leadership, ethics and contemporary issues; a second will focus on a person in order to illustrate leadership, ethics, and contemporary issues; the third will focus on an important modern episode, event or condition that exemplifies issues of ethics and leadership.
Lecture: 4, Lab 0, Other 0

Literature (LIT)

LIT-304 American Literature and Philosophy 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || Selected topics founded and expressed in literature during the philosophic and the literary development of the Republic.
Lecture: 4, Lab 0, Other 0

LIT-307 Poetry: Substance and Structure 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || An analysis of poetry written in the context of the development of intellectual concepts. Emphasis is on the philosophical content, its moral and ethical dimensions, structure, and the intellectual climate which gave rise to significant aesthetic ideals. Biography and critical interpretation are included.
Lecture: 4, Lab 0, Other 0

LIT-309 The Literature of Multicultural America 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course examines U.S. multicultural literatures from several critical perspectives. A study of primary texts by American writers whose themes and techniques of narration reflect the development of U.S. literary discourses of race, identity, myths of origin, gender, and cross-cultural communication. The broad array of texts includes novels, poetry, memoirs, and films from a multiplicity of cultural perspectives. Engagement in comparative work with an eye toward understanding the complexity and the demands of a multicultural society.
Lecture: 4, Lab 0, Other 0

LIT-310 African American Literature 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Two 200-level Liberal Arts Elective Courses || This course examines the development of African American literature from its beginnings to today, and it focuses on both what makes it unique and what anchors it in an American national identity. We will read a variety of genres, including slave narratives, novels, and poetry, place them in their historical context, and address themes such as racial and cultural identity, forms of resistance, gender relations, and the role of music. Strict attendance policy. Writing is an important component of the course.
Lecture: 4, Lab 0, Other 0

LIT-311 Literatures of the African Diaspora 4 Credits
Prerequisites: LA-201 or LS-201
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course examines literary texts written by people of African ancestry in the Atlantic world from the 18th to the 21st centuries. We particularly focus on issues related to racial and cultural identity, national identity, social class, and gender. Attention to historical context is an essential component of the course. Two major objectives are to sharpen students' reading and interpretive skills, and to improve their ability to write clearly, coherently, and persuasively. Lectures, discussions, and writing assignments all work to exercise critical thinking, a major goal of Liberal Studies.
Lecture: 4, Lab 0, Other 0

LIT-312 Literatures of Migration 4 Credits
Prerequisites: LA-201 or LS-201
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || Migration is a fundamentally human experience. Whether legal or illegal, economic or a refuge from war or persecution, migration has been both the source of profound personal and cultural enrichment and the catalyst for intense social and political conflict. This course examines literary texts that are about the migrant's experience in various parts of the world. Students explore such themes as cultural integration, cultural hybridity, the relationship to national identity, the role of race, gender, and class in the migrant's experience, the meaning of the journey, the meaning of home, and intergenerational conflicts. Attention is paid to the historical context of each work.
Lecture: 4, Lab 0, Other 0

LIT-320 Literature & Environmental Justice 4 Credits
Prerequisites: LA-201 or LS-201
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || Environmental justice describes the fair distribution of environmental benefits and burdens. Environmental justice literature forefronts narratives that investigate the consequences and histories of environmental degradation and abuse and how it affects local and global populations. In this course, students enter into an interdisciplinary analysis of a mixture of contemporary short stories, novels, graphic novels, and plays. Students will explore the concept and practice of environmental justice through political, economic, and social lenses and consider how texts think through issues of human and environmental health and cultural self-determination within the context of nuclear testing, pesticide toxicity and agricultural work, water management, and human rights. Paying special attention to the definition of “justice,” students will also consider how forms of power and activism appear and reappear throughout history in readings that focus on colonialism, globalization, gender, race, and class. Why focus on environmental justice through literature? Literature provides a detailed glimpse into the dynamics of cultural self-determination, functioning as both a form of witnessing that gives testimony to injustices and as a manifesto that aims to usher cultural groups into a more just future.
Lecture: 4, Lab 0, Other 0

LIT-372 Masterpieces of Literature 4 Credits
Prerequisites: LA-201 or LS-201
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || Course concentration will be given to learning the characteristics of several literary genres as exemplified by master writers. The course may include genres such as: Epic Narrative poetry, Classical Satire, Classical Philosophy, Medieval Narrative Poetry, Realistic Novel, Modern Short Story & Novel.
Lecture: 4, Lab 0, Other 0

LIT-374 Seminar on J.R.R. Tolkien 4 Credits
Prerequisites: LA-201 or LS-201
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This seminar examines a range of J.R.R. Tolkien’s works. These may include his epic, The Lord of the Rings in both the written and film versions (all viewings of the film will occur outside of class), his extended mythology in his unfinished The Silmarillion, his short stories and essays, and his shorter fantasy work The Hobbit. The course focuses on genre, style and themes of the works, with particular emphasis on the elements of myth and epic, and on the complex ways in which his work as a medieval scholar comes to bear on his writings and their interpretation.
Lecture: 4, Lab 0, Other 0

LIT-391 Literature Special Topics 4 Credits
Prerequisites: LA-201 or LS-201
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || An interdisciplinary advanced course focusing on a specific topic. This course is a one-time offering whose content is determined by current faculty interest, and provides a comprehensive and coherent examination of the chosen topic. This course may be repeated for credit under different topic
Lecture: 4, Lab 0, Other 0

LIT-397 Literature Free Elective 4 Credits
Prerequisites: None
Lecture: 4, Lab 0, Other 0

LIT-399 LIT Independent Study 4 Credits
Prerequisites: None
Lecture: 4, Lab 0, Other 0

Management (MGMT)

MGMT-101 Introduction to Applied Management 4 Credits
Prerequisites: None
Students will learn about the basic functions of management (leading, planning, organizing and monitoring) through application of team-based projects. The course serves to introduce students to focused teamwork, project management and systems analysis tools that will be revisited in later courses.
Lecture: 4, Lab 0, Other 0

MGMT-104 Management Concepts 4 Credits
Prerequisites: None
The art and science of management is introduced and examined through multiple perspectives within a global and ethical context. An examination of the functions of a manager (to plan, organize, lead, and evaluate) builds upon the elements of organizational theory and behavioral sciences, leading to topics in motivation and leadership. Principles of organizational structure and design and the importance of management in dealing with the complexity of modern organizations will be emphasized.
Lecture: 4, Lab 0, Other 0

MGMT-205 Organizational Behavior 4 Credits
Prerequisites: MGMT-104
This course provides an overview of human behavior in the organizational context. Topics will include coverage of individual behavior, behavior in organizations, diversity, organizational culture, organizing in an international context, working in teams, and working in organizations.
Lecture: 4, Lab 0, Other 0

MGMT-313 Marketing Research 4 Credits
Prerequisites: BUSN-271 or MATH-258
Students will learn about connecting business to consumers, with an emphasis on analyzing consumer desires and needs to guide management decisions related to product design and realization. Students will also learn about researching markets, market segmentation, consumer behavior, and how these concerns relate to marketing strategy.
Lecture: 4, Lab 0, Other 0

MGMT-314 Financial Statement Analysis 4 Credits
Prerequisites: BUSN-331
This course is designed to prepare students to interpret and analyze financial statements for tasks such as risk assessment, lending and investment decisions, forecasting, and decision-making. The course will include both quantitative tools to use and qualitative factors to consider in evaluating the firm's financial statements.
Lecture: 4, Lab 0, Other 0

MGMT-315 Operations and Supply Chain Management 4 Credits
Prerequisites: BUSN-221 and BUSN-312
This course is designed to provide students with an overview of managing operations processes both within the organization and across organizational boundaries in order to create new value for the end customer of the supply chain. Course content will include inbound materials management, service procurement, production processes and outbound distribution.
Lecture: 4, Lab 0, Other 0

MGMT-333 Competency in Professional Management 4 Credits
Prerequisites: None
Minimum Class Standing: Sophomore
This course consists of intensive study in 8 key areas of business that, along with the demonstrated competency in required mathematics, statistics and economics acquired in separate courses, will prepare non-business undergraduate students to embark on graduate studies in business. Students are required to complete learning modules in Accounting, Finance, Marketing, Global Dimensions of Business, Legal Environment of Business, Information Management Systems, Organizational Behavior, and Business Integration and Strategy which encompass accreditor expectations for the Undergraduate Common Professional Component (CPC).
Lecture: 3, Lab 2, Other 0

MGMT-391 Management Special Topics 4 Credits
Prerequisites: None
Lecture: 4, Lab 0, Other 0

MGMT-419 Project Management 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
This course covers managing projects within an organizational context, including the processes related to initiating, planning, executing, controlling, reporting, and closing a project. Concepts such as project integration, scope, time, cost, quality control, and risk management are highlighted. Identifying project champions, working with user teams, training, and documentation are key concepts of project management that are detailed in the course.
Lecture: 4, Lab 0, Other 0

MGMT-423 Data Analytics 4 Credits
Prerequisites: (BUSN-271 or MATH-258) and (CS-101 or IME-211)
Minimum Class Standing: Senior
The rise of big data and machine learning has transformed the business world. In fact, these tectonic shifts in the business landscape are labeled as the fourth industrial revolution. Data is the new oil, creating enormous wealth and opportunity for businesses. This course will introduce the strategic importance and applications of these new Artificial Intelligence (AI) technologies. This is a hands-on learning course focusing on developing skills in using the Python language for data cleaning, exploration and modeling. The overarching aim is to provide a strong start towards developing skills that will eventually lead towards becoming an accomplished data scientist, who understands and is able to apply these skills towards achieving organizational competitive advantage.
Lecture: 4, Lab 0, Other 0

MGMT-424 Data Visualization 4 Credits
Prerequisites: (CS-101 or IME-211) and (BUSN-271 or MATH-258)
Minimum Class Standing: Senior
This course encompasses the principles, techniques, aesthetics, and applications of data visualization. Starting with development of the basics of computer programming for visualization, the students learn methods to develop effective univariate, multivariate, and high dimensional data visualizations. The course also covers geographic and text-based visualization techniques. The course uses the highly demanded Python-based packages: Matplotlib, Seaborn, and Plotly. Students will also develop skills in using the grammar of graphics approach encapsulated in ggplot.
Lecture: 4, Lab 0, Other 0

MGMT-425 Digital Strategy and Competitive Advantage 4 Credits
Prerequisites: None
Minimum Class Standing: Senior
This course is the intersection of strategic management with data-science. Cases and simulations are used to examine how firms use strategy and data-science to build competitive advantage. The course explores the strategy and dynamics of Artificial Intelligence (AI) based firms. It also brings the perspectives of practicing data-scientists and expands on their roles in reshaping the competitive landscape of their industries.
Lecture: 4, Lab 0, Other 0

MGMT-465 Strategic Management 4 Credits
Prerequisites: None
Minimum Class Standing: Senior
Students will learn how to apply a holistic perspective to analyzing and positioning organizations and business units for competitive advantage. The focus of the course will be on a systemic approach to management decisions that foster organizational success.
Lecture: 4, Lab 0, Other 0

MGMT-479 Leadership 4 Credits
Prerequisites: MGMT-205
A comprehensive examination of different leadership theories and models along with leadership development emphasizing relevant empirical evidence and application of these constructs to case studies that involve leadership and group functioning. Additionally, process of decision-making in a variety of leadership settings will be introduced, including the processes of leading independently or with direct authority. The distinction between leadership and management, crucial role of leadership when managing groups and teams, and the importance of ethical conduct and persuasion in effective leadership are covered.
Lecture: 4, Lab 0, Other 0

MGMT-484 Business Consulting Project 4 Credits
Prerequisites: None
Minimum Class Standing: Senior
This is the capstone course for the Management Major and is designed to provide students with practical, hands-on experience consulting with organizational leadership. This course will require extensive field work. The course will revolve around a single consulting project. Working with the principals of the organization, students will be responsible for gaining a strong understanding of the issues, and related relevant factors associated with improving organizational performance. Students will be required to offer a workable plan to address the issues that are identified over the course of the project.
Lecture: 4, Lab 0, Other 0

MGMT-510 Foundations of Business 4 Credits
Prerequisites: None
This course provides the prerequisite knowledge necessary for studying management in a graduate program. Students are introduced to both a theoretical understanding, and practical application, of concepts in the disciplines of management, marketing, accounting, finance, economics, and statistics. Through readings, videos, discussion questions, and assignments, students are introduced to basic content from each topic area, as well as APA writing style, in preparation for entry into a graduate management program.
Lecture: 4, Lab 0, Other 0

MGMT-521 Statistical and Quantitative Methods for Managerial Decision 4 Credits
Prerequisites: None
Learn about the principles and techniques for collecting, analyzing, interpreting, and communicating information based on data. Data analysis emphasizes the fundamentals behind designing data collection strategies that lead to useful information for problem solving and process and product improvements. Data analysis techniques include descriptive statistics, basic hypothesis testing, experimental design, and regression analysis. Use of a statistical software will be made to illustrate important data analysis concepts with a focus on understanding the computer output. The project requirement is expected to enable students to apply the data analysis concepts learned in the class. In summary, this course will assist the students to become knowledgeable consumers of data analysis, its applications and limitations.
Lecture: 3, Lab 0, Other 1

MGMT-550 Mgmt Concepts and Applications 2 Credits
Prerequisites: None
Both the art and the science of management will be introduced and examined through multiple perspectives within a global and ethical context. An examination of the functions of a manager builds upon the elements of organizational and behavioral theory. Principles of organizational structure and design will also be discussed. The importance of management in dealing with the complexity of modern organizations will be emphasized throughout.
Lecture: 2, Lab 0, Other 0

Mathematics (MATH)

MATH-100 College Mathematics 4 Credits
Prerequisites: None
A study of functions and their algebra and graphs. Special functions of engineering and science are emphasized, including polynomial, trigonometric, and exponential functions and their inverses. Concepts and methods of algebra, trigonometry, and analytic geometry important to calculus are also emphasized. NOTE: While there are no pre-reqs for this course, enrollment is a result of Math Placement exam score. Failure to take this exam results in placement in MATH-100. Credits for MATH-100 do not apply to degree requirements. Also, placement in MATH-100 may delay entry in courses for which calculus is a prerequisite.
Lecture: 4, Lab 0, Other 1

MATH-101 Calculus I 4 Credits
Prerequisites: None
An introduction to the theory and techniques of differentiation of polynomial, trigonometric, exponential, logarithmic, hyperbolic, and inverse functions of one variable. Also included are limits, continuity, derivative applications and interpretations. Computer software will be used to aid in understanding these topics. NOTE: Students can place into 101 with a sufficient score on the Math Placement Exam, or permission of Department Head.
Lecture: 4, Lab 0, Other 0

MATH-101X Calculus I 4 Credits
Prerequisites: None
This course is for students showing a lack of proficiency in algebra and trigonometry on the Math Placement examination. The course contains the same material as MATH-101 but in addition, includes a review of algebraic expressions, trigonometic functions and their inverses, and analytic geometry. Computer software will be used to aid in understanding these topics. NOTE: Students can place into 101X with a sufficient score on the Math Placement Exam, or permission of Department Head.
Lecture: 4, Lab 0, Other 1

MATH-102 Calculus II 4 Credits
Prerequisites: MATH-101
NOTE: Students also must receive a minimum grade of C in MATH-101. Riemann integration and the Fundamental Theorem of Calculus, including applications to area, volume, etc., and basic methods for conversion of integrals including change of variable, substitutions, partial fractions, integration by parts, improper integrals and numerical integration. Also introduced are sequences and series in one variable with emphasis on Taylor Series. Computer software will be used to aid in understanding these topics.
Lecture: 4, Lab 0, Other 0

MATH-102H Calculus II - Honors 4 Credits
Prerequisites: MATH-101
Honors Calculus II is a deeper, more conceptual, rigorous, and limit based version of Calculus II (MATH-102). It is designed for students with strong mathematical skills. Riemann integration and the Fundamental Theorem of Calculus, including applications to area, volume, etc., and basic methods for conversion of integrals including change of variable, substitutions, partial fractions, integration by parts, improper integrals and numerical integration. Also introduced are sequences and series in one variable with emphasis on Taylor Series. Computer software will be used to aid in understanding these topics.
Lecture: 4, Lab 0, Other 0

MATH-102X Calculus II 4 Credits
Prerequisites: MATH-101 or MATH-101X
NOTE: Students also must receive a minimum grade of C in MATH-101X. This course is for students who want to improve their skills in Trigonometry and Differential Calculus. It contains the same material as MATH-102 but is taught at a slower pace and with more examples and sample problems. In addition, it includes reviews of Trigonometry and Differential Calculus.
Lecture: 4, Lab 0, Other 1

MATH-203 Multivariate Calculus 4 Credits
Prerequisites: MATH-102 or MATH-102X
A study of polar coordinates, parametric equations, and the calculus of functions of several variables with an introduction to vector calculus. Topics include surface sketching, partial derivatives, gradients, differentials, multiple integrals, cylindrical and spherical coordinates and applications. Computer software will be used to aid in understanding these concepts.
Lecture: 4, Lab 0, Other 0

MATH-203H Multivariate Calculus - Honors 4 Credits
Prerequisites: MATH-102H or MATH-102 or MATH-102X
Honors Multivariate Calculus is an extended, deeper, more conceptual, rigorous, and limit-based version of Multivariate Calculus (MATH-203). The course is designed for students with strong mathematical skills. The topics include parametric equations, polar, Cartesian, cylindrical, and spherical coordinates, vector algebra, equations of lines, planes, and quadratic surfaces, calculus of functional of several variables, unconstrained and constrained optimization problems, multidimensional integrals, change of variables, and elements of vector calculus. Computer software will be used to aid in understanding these topics and for graphical visualization.
Lecture: 4, Lab 0, Other 0

MATH-203X Multivariate Calculus 4 Credits
Prerequisites: MATH-102 or MATH-102H or MATH-102X
A study of polar coordinates, parametric equations, and the calculus of functions of several variables with an introduction to vector calculus. Topics include surface sketching, partial derivatives, gradients, differentials, multiple integrals, cylindrical and spherical coordinates and applications. Computer software will be used to aid in understanding these concepts.
Lecture: 5, Lab 0, Other 0

MATH-204 Differential Equations & Laplace Transforms 4 Credits
Prerequisites: MATH-203 or MATH-203H or MATH-203X
Minimum Class Standing: Freshman
Terms Offered: Summer, Fall, Winter, Spring
An introduction to the principles and methods for solving first order, first degree differential equations, and higher order linear differential equations. Includes a study of the Laplace transform and its application to the solution of differential equations. Existence and uniqueness theorems for O.D.E.'s are also discussed.
Lecture: 4, Lab 0, Other 0

MATH-204H Differential Equations and Laplace Transforms - Honors 4 Credits
Prerequisites: MATH-203 or MATH-203H
Honors Differential Equations and Laplace Transform is an extended, deeper, more conceptual, rigorous version of MATH-204. The course is designed for students with strong mathematical skills. The additional topics include Cauchy-Euler Equation, the Dirac Delta Function, Linear Models: Boundary Value Problems, Systems of Linear Differential Equations, and optional advanced topics, e.g. Power Series Solution and Solutions About Singular Points.
Lecture: 4, Lab 0, Other 0

MATH-258 Probability and Statistics 4 Credits
Prerequisites: MATH-102 or MATH-102X or MATH-102H
Minimum Class Standing: Sophomore 1
This course introduces fundamentals of probability together with examples of discrete and continuous random variables, including Bernoulli, binomial, Poisson, normal, exponential and gamma random variables. Descriptive and inferential parametric statistics for one and two populations is covered. Correlation, simple and multiple linear regression, and single factor ANOVA are studied. A statistical package MINITAB or R is used throughout the course.
Lecture: 4, Lab 0, Other 0

MATH-291 Mathematics Special Topics 4 Credits
Prerequisites: None
Terms Offered: As needed
Mathematics Special Topics
Lecture: 4, Lab 0, Other 0

MATH-305 Numerical Methods and Matrices 4 Credits
Prerequisites: MATH-204 or MATH-204H
Minimum Class Standing: Sophomore
An introduction to numerical methods including the study of iterative solutions of equations, interpolation, curve fitting, numerical differentiation and integration, and the solution of ordinary differential equations. An introduction to matrices and determinants; application to the solution of linear systems.
Lecture: 4, Lab 0, Other 0

MATH-307 Matrix Algebra 4 Credits
Corequisites: MATH-102
Prerequisites: MATH-101 or MATH-101X
A study of matrix concepts including such topics as basic algebraic operations, determinants, inversion, solution of systems of linear equations, vector spaces, basis and dimension, eigenvalues, and eigenvectors.
Lecture: 4, Lab 0, Other 0

MATH-308 Abstract Algebra 4 Credits
Prerequisites: (MATH-307) or (CS-211 and MATH-101) or (CS-211 and MATH-101X)
Minimum Class Standing: Sophomore
Students will learn topics in modern algebra and will practice proof techniques. Topics will include: congruence classes, modular arithmetic, groups, subgroups, normal subgroups, Lagrange's theorem, rings, subrings, ideals, quotient rings, isomorphisms and homomorphisms, polynomial arithmetic, fields, divisors, factorization, and proofs of the main theorems. The course is required for mathematics majors and is also useful in cryptography and quantum physics.
Lecture: 4, Lab 0, Other 0

MATH-313 Boundary Value Problems 4 Credits
Prerequisites: MATH-204 or MATH-204H
Minimum Class Standing: Sophomore 2
An introduction to linear partial differential equations (PDE's) and basic techniques of applied mathematics used to solve initial, boundary value problems associated with these equations. Topics include: derivation of some of the fundamental PDE's' and boundary conditions that arise in science and engineering; Fourier Series; Sturm-Liouville Systems including eigenvalues, eigenfunctions and eigenfunction expansions; the separation of variables techniques; Fourier Transforms. Applications to problems of science and engineering will be given throughout the course.
Lecture: 4, Lab 0, Other 0

MATH-321 Real Analysis I 4 Credits
Prerequisites: MATH-203 or MATH-203H or MATH-203X
Minimum Class Standing: Junior
A more advanced study of functions in one real variable including limits, uniform continuity, differentiation, integration, and sequences and series of functions; topology of R.
Lecture: 4, Lab 0, Other 0

MATH-327 Probability & Stochastic Modeling 4 Credits
Prerequisites: MATH-203 or MATH-203H or MATH-203X
Minimum Class Standing: Sophomore
This is a calculus-based introduction to probability theory and stochastic modeling. Students will learn fundamentals of probability, discrete and continuous random variables, expectation, independence, Bayes' rule, important distributions and probability models, joint distributions, conditional distributions, distributions of functions of random variables, moment generating functions, the Central Limit Theorem, laws of large number. Programming language R will be introduced and used throughout the course.
Lecture: 4, Lab 0, Other 0

MATH-328 Methods of Applied Mathematics 4 Credits
Prerequisites: MATH-204 or MATH-204H
Minimum Class Standing: Junior
Topics from advanced calculus, dimensional analysis and scaling, perturbation and asymptotic methods, calculus of variations and integral equations. Applications of these tools to problems in engineering will be included.
Lecture: 4, Lab 0, Other 0

MATH-330 Biostatistics 4 Credits
Prerequisites: MATH-258
Minimum Class Standing: Sophomore II
This course covers topics in the design of experiments and data analysis useful in biostatistics; including screening tests, analysis of categorical data, nonparametric methods, ANOVA and ANCOVA, nested designs, multiple regression, logistic regression and its extensions, design and analysis techniques for epidemiologic studies. Computer packages such as MINITAB or R will be used for all applications and the analysis of data sets.
Lecture: 4, Lab 0, Other 0

MATH-350 Financial Mathematics 4 Credits
Prerequisites: (MATH-102 or MATH-102X or MATH-102H)
Minimum Class Standing: Junior
This course provides an understanding of the fundamental concepts of financial mathematics, and how they are applied in calculating present and accumulated values for various streams of cash flows. These concepts are later used in reserving, valuation, pricing, asset/liability management, investment income, capital budgeting, and valuing contingent cash flows. Key terms studied include inflation, rates of interest, term structure of interest rates, yield rate, equation of value, accumulation function, discount function, annuity, perpetuity, interest rate swaps and bonds. Procedures like determining equivalent measures of interest, discounting, accumulating,, amortization will be covered. Modern topics of financial analysis will be introduced, such as yield curves, spot rates, forward rates, duration, convexity and immunization.
Lecture: 4, Lab 0, Other 0

MATH-360 Life Contingencies I 4 Credits
Prerequisites: MATH-350
Minimum Class Standing: Junior
This course is an introduction to life insurance mathematics based on a stochastic approach. This course is to develop a student's knowledge of the theoretical basis of certain actuarial models and the application of those models to insurance and other financial risks. Definitions of key terms will be studied, including actuarial present value, survival model, life insurance, annuities, and benefit premiums.
Lecture: 4, Lab 0, Other 0

MATH-361 Life Contingencies II 4 Credits
Prerequisites: MATH-360
Minimum Class Standing: Junior 2
This is a continuation of Life Contingencies I. Development is based on a stochastic approach to life insurance models. Definitions of key terms will be studied, including benefit reserves, and multi-life and multiple-decrement models.
Lecture: 4, Lab 0, Other 0

MATH-412 Complex Variables 4 Credits
Prerequisites: MATH-203 or MATH-203H or MATH-203X
Minimum Class Standing: Sophomore
An introduction to the theory of complex variables. Includes basic algebra of complex numbers, analytic functions and the Cauchy-Riemann equations, elementary transformations, complex integration, the Cauchy integral formulas, Taylor and Laurent series, and the theory of residues.
Lecture: 4, Lab 0, Other 0

MATH-416 Vector Analysis 4 Credits
Prerequisites: MATH-203 or MATH-203H or MATH-203X
Minimum Class Standing: Sophomore 2
An introduction to vector algebra and calculus including vector products, vector functions, and their differentiation and integration, gradients, line and surface integrals, conservative fields and potentials functions, Green's theorem, parametric equations, curvature, and curvilinear coordinates.
Lecture: 4, Lab 0, Other 0

MATH-418 Systems of Linear Differential Equations and Control 4 Credits
Prerequisites: MATH-204 and (MATH-305 or MATH-307)
Minimum Class Standing: Junior
Systems of linear differential equations (ODE's) will be studied.Topics include: systems of linear ODE's with constant coefficients, matrix exponential, solutions based on the Laplace transform, general solutions, and stability. An introduction to control of finite-dimensional dynamical systems will be given. Topics include reachability, controllability, observability, state transformations, minimal realizations,close loop control, and eigenvalue assignment.
Lecture: 4, Lab 0, Other 0

MATH-421 Real Analysis II 4 Credits
Prerequisites: MATH-321
Minimum Class Standing: Junior 2
An introduction to the study of real functions including metric spaces, normed linear spaces, Hilbert Spaces, and linear operators.
Lecture: 4, Lab 0, Other 0

MATH-423 Partial Differential Equations 4 Credits
Prerequisites: MATH-305 and MATH-313
Minimum Class Standing: Junior
This course is a continuation of MATH-313. Topics include Bessel's equation and Legendre's equation, boundary value problems in curvilinear coordinate systems, Green's functions for ordinary and partial differential equations. Applications to problems of science and engineering will be given throughout the course.
Lecture: 4, Lab 0, Other 0

MATH-427 Statistical Inference & Modeling 4 Credits
Prerequisites: MATH-327
Minimum Class Standing: Sophomore I
A study of statistics including point and interval estimation, consistency and sufficiency, Minimum Variance Unbiased Estimators, Uniformly Most Powerful tests, likelihood ratio tests, goodness of fit tests, an introduction to non-parametric methods. Linear models, including regression analysis and Analysis of Variance are included. Programming in R will be introduced and used throughout the course.
Lecture: 4, Lab 0, Other 0

MATH-428 Sampling Theory 4 Credits
Prerequisites: MATH-327
Minimum Class Standing: Senior
A study of sampling theory including probability sampling, simple random sampling, sample size estimates, stratified sampling, and cluster sampling.
Lecture: 4, Lab 0, Other 0

MATH-430 Statistical Methods for Data Science 4 Credits
Prerequisites: MATH-258 or MATH-327
This is a course on statistical methods for data science with an emphasis on statistical learning. It provides a set of tools for modeling and understanding big and complex data. This course concentrates on applications and practical execution of the methods rather than on mathematical details. Areas discussed include regression models, shrinkage methods, classification methods: logistic regression, LDA, QDA, SVM, KNN, resampling: LOOCV, CV, and bootstrap, model selection using resampling and training/test data, non-linear techniques including splines and local regression, tree-based methods, support vector machines, unsupervised learning, and elements of neural networks. Programming language R will be introduced and used throughout the course.
Lecture: 4, Lab 0, Other 0

MATH-450 Statistics for Risk Modeling 4 Credits
Prerequisites: MATH-427
Minimum Class Standing: Junior I
This course will prepare students to understand key concepts in the following categories of applied statistics: statistical learning, R programming language, construction of generalized linear models, regression-based time series models, principal components analysis, decision tree models and cluster analysis. Students will choose appropriate models, interpret model results and perform necessary calculations for statistical inference and prediction to answer the underlying business questions. Students are also assumed to have knowledge of probability and mathematical statistics.
Lecture: 4, Lab 0, Other 0

Mechanical Engineering (MECH)

MECH-111 Computer Programming for MEs 4 Credits
Prerequisites: None
The fundamentals of computer programming are the focus of this course, with its emphasis on digital computing, basic programming skills, and algorithm writing. MATLAB is used as the computer programming language, although programming skills are developed that transcend languages. Students are taught primarily about algorithmic thinking and engineering problem solving, rather than computer programming syntax. Algorithm writing is introduced using examples that are drawn from mechanical engineering.
Lecture: 4, Lab 0, Other 0

MECH-210 Statics 4 Credits
Corequisites: MATH-102, PHYS-114, PHYS-115
Prerequisites: MATH-101 or MATH-101X
This course deals with a discussion and application of the following fundamental concepts: (1) static force analysis of particles, rigid bodies, plane trusses, frames, and machines; (2) first and second moments of area; (3) friction; (4) internal forces; and (5) stress deflection analysis of axially loaded members. Topics covered will be (1) the static force and moment equilibrium of two and three dimensional systems; (2) resultant forces and moments due to the application of concentrated and/or distributed loads; (3) couples; (4) the center of mass and the area moment of inertia of a rigid body; (5) shear force and bending moment diagrams of a rigid body; and (6) the stress and deflection analyses of axially loaded members. Free body diagrams will be formulated in a computer-aided environment in order to enhance the students' critical thinking and problem solving capabilities. Several open-ended homework and mini projects will be assigned in order to incorporate a design experience in the course.
Lecture: 4, Lab 0, Other 0

MECH-211 Circuits and Mechatronics 4 Credits
Prerequisites: (MECH-111 or CS-100 or CS-101 or ECE-101) and PHYS-224 and PHYS-225
This course discusses mechatronics concepts within a mechanical engineering context. This includes DC circuit design, microcontroller programming, digital and analog input and output, signal conditioning, and how these concepts can be used to control mechanical systems.
Lecture: 4, Lab 0, Other 0

MECH-212 Mechanics of Materials 4 Credits
Prerequisites: MECH-210
The fundamental topics of this course include: normal and shear stress and strain, Hooke's law, Poisson's ratio, generalized Hooke's law, axial translation, torsion of circular bars, angle of twist, bending of beams, flexure formula, flexural shear stress, beam deflections, combined stresses, transformation of stresses, Mohr's circle, statically indeterminate problems, columns. The use of basic computational tools will be introduced at the end of several lecture modules including: axial loading, torsional loading, and flexural loading. Homework and design projects will be assigned.
Lecture: 4, Lab 0, Other 0

MECH-231L Signals for Mechanical Systems Lab 1 Credits
Prerequisites: PHYS-224 and PHYS-225
This lab complements the electrical engineering course, EE-212, and provides the necessary knowledge and skills of electrical engineering to non-electrical engineering majors. It teaches students how to use sensors and instruments to make meaningful measurements in mechanical and electrical engineering systems. This lab course introduces students to: (1) the laws and methods of circuit analysis (2) sensors used in measurements of displacement, temperature, strain and fuel cell systems and (3) the amplifiers and other instrumentation used to process the signals from these sensors.
Lecture: 0, Lab 2, Other 0

MECH-300 Computer Aided Engineering 4 Credits
Prerequisites: IME-100 and MECH-212
This course is focused on computer aided engineering (CAE). Basic and advanced techniques are included, involving creation of two-dimensional (2D) and three-dimensional (3D) technical drawings, assembly generation and parametric modeling methods. An introduction to computer simulation, using Finite Element Analysis (FEA), is incorporated. It is utilized for analysis of common structural components.
Lecture: 4, Lab 0, Other 0

MECH-307 Materials Engineering 4 Credits
Prerequisites: (CHEM-135 or CHEM-137) and CHEM-136
This course will develop the skills of identifying appropriate materials for a given design by considering mechanical properties which are based on experimental data. The manner in which processing can be used to engineer a material for specific applications will be explored. The mechanical performance of materials will be assessed by comparing a range of properties; strength, modulus, Poisson's ration, coefficient of thermal expansion, ductility, toughness, corrosivity, and others. Students will learn which properties can and cannot be engineered to meet a specific need via alloying and/or heat treating.
Lecture: 4, Lab 0, Other 0

MECH-310 Dynamics 4 Credits
Prerequisites: MECH-210 and PHYS-114 and PHYS-115 and (MATH-102 or MATH-102X or MATH-102H)
This course deals with a discussion and application of the following fundamental concepts: (1) application and basics of Newtonian mechanics and physical laws; (2) a study of the kinematics and kinetics of a particle including relative and absolute motion, friction concepts; (3) additional analysis of particle dynamics using work-energy and impulse-momentum methods, analysis of impact events; (4) analysis of a system of particle using work-energy, impulse, linear and angular momentum; (5) kinematics and kinetics of a rigid bodies analyzed in various reference systems; (6) additional analysis of rigid body dynamics using work-energy and impulse-momentum; (7) inertia quantities. Computational techniques will be incorporated into several design projects throughout the semester to illustrate alternative solution methods.
Lecture: 4, Lab 0, Other 0

MECH-311 Mechatronics Systems Design 4 Credits
Prerequisites: MECH-211 and PHYS-224 and PHYS-225
This course explores mechatronics as a design philosophy. Students will learn to integrate electrical and software elements into mechanical designs to create systems that are able to respond to their environment and execute tasks without human interaction. Concepts will be applied with individual and team projects, designing, building, and testing mechatronic systems.
Lecture: 2, Lab 3, Other 0

MECH-312 Mechanical Component Design I 4 Credits
Prerequisites: MECH-212
This course involves application of theory and techniques learned in the mechanics courses to the concepts of mechanical component design. Through lectures and class example and homework problems the student will be introduced to design methodology. This methodology requires learning to develop and set-up a mechanical component design problem, through properly understanding and solving the problem based upon the given data, design constraints, making and verifying assumptions. Selection of the proper analytical tools as required, producibility and maintainability of the design, materials selection, safety, and cost considerations. Take-home project problems will enhance and demonstrate the type of study and research required for design. Topics to be studied include strength and fatigue considerations, shaft design, threaded fasteners, lubrication and bearings, springs, and fundamentals of gear analysis, including forces, stresses and terminology.
Lecture: 4, Lab 0, Other 0

MECH-320 Thermodynamics 4 Credits
Prerequisites: PHYS-224 and PHYS-225
A study of the first and second laws of thermodynamics and their application to energy conversions for closed systems and engineering devices undergoing various processes. Property relations for pure substances, ideal gases, and atmospheric air are analyzed. Gas cycles including spark-ignition and compression-ignition engines, and turbine cycles in addition to steam power cycles and refrigeration cycles are evaluated to determine performance parameters and energy efficiencies. This course includes laboratory experiments to validate the theory and a term project related to a contemporary environmental topic.
Lecture: 3, Lab 2, Other 0

MECH-322 Fluid Mechanics 4 Credits
Prerequisites: MECH-320
This is a first course in Fluid Mechanics that involves the study of fluid flow in ducts and over objects. The course introduces the fundamental aspects of fluid motion, fluid properties, flow regimes, pressure variations, fluid kinematics, and methods of flow description and analysis. Presents the conservation laws in their differential and integral forms, and their use in analyzing and solving fluid flow problems. In addition, the concept of using similitude and dimensional analysis for organizing test data and for planning experiments is introduced. The effects of fluid friction on pressure and velocity distributions are also discussed. The effects of compressibility (various density) on fluid flows are also included.
Lecture: 3, Lab 2, Other 0

MECH-330 Dynamic Systems with Vibrations 3 Credits
Corequisites: MECH-331
Prerequisites: (MATH-204 or MATH-204H) and MECH-310
This is the first course in System Dynamics. The objective of this course is to provide an understanding into basic principles and methods underlying the time domain, dynamic characterization of physical systems and components. The focus is on a multi-discipline approach. Derivation of mathematical models of systems using energy and state space models is emphasized. Application of modeling techniques to understand the behavior of free vibration (damped and undamped), forced vibration for harmonic excitation, and systems involving multi-degrees of freedom, including the use of frequency response and Bode plots, will be discussed. MECH-331 must be taken concurrently (or previously passed) with this course.
Lecture: 3, Lab 0, Other 0

MECH-331 Dynamic Sys w Vibrations Lab 1 Credits
Corequisites: MECH-330
Prerequisites: (MATH-204 or MATH-204H) and MECH-310
This is the lab component accompanying the first course in System Dynamics. The objective of this course is to provide an understanding of basic principles of modeling and simulation of dynamic systems. The application of material covered in MECH-330 is stressed, with both computational and equipmentbased lab experiences designed to reinforce the lecture content. MECH-330 must be taken concurrently (or previously passed) with this course.
Lecture: 0, Lab 1, Other 0

MECH-350 Introduction to Bioengineering Applications 4 Credits
Prerequisites: MECH-210
This course deals with a discussion and application of the following fundamental concepts: (1) basic anatomy and physiology of the overall human body; (2) basic anatomy and physiology of specific structures including brain, ear, eyes, heart, kidney, gastro-intestinal system, articular joints, and bones; (3) an appreciation of the engineering basis for current and developmental products designed to diagnose and replace these biological structures; (4) exposure to biochemistry, biomaterials, and biomechanics at a fundamental level; and (5) an understanding of current laws which govern bioengineering device manufacturing. A semester project will require the student to rigorously research an existing product or emerging technology of relevance to bioengineering and the human body.
Lecture: 4, Lab 0, Other 0

MECH-397 MECH Free Elective 4 Credits
Prerequisites: None
This is a Mechanical Engineering course used to record credit for transfer or guest courses ONLY that are not equivalent to existing Kettering University Mechanical Engineering courses.
Lecture: 4, Lab 0, Other 0

MECH-410 Application of Artificial Intelligence in Mechanical Engineering 4 Credits
Prerequisites: MECH-300 and MECH-311 and MECH-330 and MECH-420
This course examines the applications of Artificial Intelligence (AI) in mechanical engineering. Students will learn how AI technologies, such as machine learning, deep learning, and optimization algorithms, alter traditional mechanical engineering practices. Emphasis will be placed on real-world applications, hands-on projects, and using AI tools like Python, MATLAB, and commercial software platforms.
Lecture: 4, Lab 0, Other 0

MECH-412 Mechanical Component Design II 4 Credits
Prerequisites: MECH-307 and MECH-312
This course is an extension of MECH-312, Mechanical Component Design I. Topics to be studied will include wear and contact stress analysis, helical and bevel gear systems, impact analysis, temperature effects in design, introduction to fracture mechanics, code based design, welded connections, and topics selected by the students. Course work will consist of lectures plus, the students will perform research on these topics and provide written and oral reports, including examples.
Lecture: 4, Lab 0, Other 0

MECH-415 Engineering Optimization 4 Credits
Prerequisites: MATH-204 and (MATH-305 or MATH-307)
Minimum Class Standing: Senior
Introduction to the general model of numerical optimization and its application to engineering design. The formulation and classification of the optimization problems will be discussed. The computational search techniques for solving the different classes of optimization problems will be studied. These techniques include single and multivariable, zero and first order constrained and unconstrained, linear and nonlinear search algorithms. The developed algorithms will be used to find the optimum solutions for a variety of engineering design problems.
Lecture: 4, Lab 0, Other 0

MECH-416 Introduction to Finite Element Analysis with Structural Applications 4 Credits
Prerequisites: None
The main objective of this course is to introduce the theory of Finite Element Method with applications to simple and real-world structural components. Both 1-D and 2-D formulations will be presented and discussed. Commercial F.E.A. codes such as NX, ANSYS and/or other software will be integrated to enhance the understanding of the theory presented. Other engineering and math software application programs such as MATLAB/Maple will also be used. Several practical design projects will be assigned during the term of this course.
Lecture: 4, Lab 0, Other 0

MECH-420 Heat Transfer 4 Credits
Prerequisites: MECH-320 and MECH-322
This course addresses the principles of heat transfer by conduction, convection, radiation and energy conservation, fins, steady-state and transient problems, and analysis and selection of heat exchangers.
Lecture: 3, Lab 2, Other 0

MECH-421 Energy and Environmental System Design 4 Credits
Corequisites: MECH-422
Prerequisites: MECH-300 and MECH-307 and MECH-312 and MECH-420
Minimum Class Standing: Senior
The objective of this course is to provide a comprehensive capstone design experience in the engineering and design of energy systems. Students will work in design teams to complete the design of an energy efficient and environmentally friendly system for use in a residential or commercial building, a power plant, or any other system that requires energy. The course covers one or more of the following energy sources or energy conversion devices: fossil, solar, wind, tidal, hydro, wave, biomass, geothermal, alternative fuels, or fuel cells.
Lecture: 4, Lab 0, Other 0

MECH-424 Vehicle Electrification Overview 4 Credits
Prerequisites: None
Minimum Class Standing: Senior 1 or Graduate
Fundamentals of Battery Electric Vehicles (BEVs) and Hybrid Electric Vehicles (HEVs); electrified vehicles attributes; design, economical, and regulatory considerations; electrified propulsion system; eDrive system; differences with conventional (ICE) vehicles; energy management and energy recovery; energy efficiency of xEVs vs. ICE vehicles; high-voltage battery (HVB) systems; high-voltage BEV platforms; 800-Volt platform architecture; functional safety; charging standards; fast charging; wireless charging; EMC requirements; NVH characteristics; power electronics; future trends.
Lecture: 4, Lab 0, Other 0

MECH-425 Sustainable Energy: Analysis and Modeling 4 Credits
Prerequisites: MECH-322
This course focuses on the technical analysis, feasibility, and modeling of sustainable energy systems. The course covers solar, wind, hydro, biomass, geothermal, and wave energies. Students analyze sustainable energy systems analytically and model them, as well, using specialty software programs such as HOMER and PVsyst. Students extend their learning to Hydrogen as an energy carrier and fuel cells and related applications. Students also showcase their learning by carrying out a project selecting a sustainable energy system as a replacement of a conventional system and offer it as an engineering solution, supported by technical and economic analyses.
Lecture: 4, Lab 0, Other 0

MECH-426 Fuel Cell Science and Engineering 4 Credits
Prerequisites: CHEM-135 and CHEM-136 and MECH-322
The objectives of this course are to introduce the students to and provide an extensive experience in the engineering and design of fuel cell devices. The course lecture will cover the five main types of fuel cells and their operational parameters and applications, efficiency and open circuit voltages. Other topics include: fuel cell systems, compressors, turbines, fans, blowers, pumps, DC voltage regulation and voltage conversion, fuels for fuel cells and methods of processing. Codes and standards of operating a fuel cell powered device will be presented as well as laws regulating the transportation of hazardous materials contained within these devices. Students will also study the design requirements for the introduction of fuel cells into various devices such as: golf-cart, bicycles, laptops, toys, road signs, etc. The lecture is supported with laboratory experiences.
Lecture: 4, Lab 0, Other 0

MECH-427 Energy and the Environment 4 Credits
Prerequisites: None
This course covers energy conversion and conservation, fossil fuels, renewable and bio-fuels, solar, geothermal and nuclear energy, alternative energy (wind, water, biomass), hydrogen as an energy carrier, historical context of the technology, the role of energy in society (economic, ethical, and environmental considerations), energy forecasts and the trend toward a hydrogen economy. Public policy, global warming and Co2 footprints and offsetting are also discussed.
Lecture: 4, Lab 0, Other 0

MECH-428 Bio and Renewable Energy 4 Credits
Prerequisites: PHYS-114 and PHYS-115
This course provides an opportunity for the students to study bio and renewable energy and their applications around the globe. The students also perform hands-on experiments in several areas of sustainable energy. The fundamental principles required will be provided prior to laboratory experimentation. Topics covered include bur are not limited to solar thermal energy and photovoltaics, wind energy, energy storage, bioenergy used for power, transportation and heating, PEM fuel cells, and alternative energy vehicles.
Lecture: 3, Lab 1, Other 0

MECH-430 Dynamic Systems with Controls 3 Credits
Corequisites: MECH-431
Prerequisites: MECH-330 and MECH-331 and MATH-305
The objective of this course is to build upon previous knowledge of multidiscipline system modeling to understand basic principles and design methods underlying steady-state and dynamic analysis of control systems. System performance is analyzed in both time and frequency domains using computer simulation. Classical control system design with both feedforward and feedback configurations are emphasized. Key topics include PID control, root locus plots, and Nyquist plots. MECH-431 must be taken concurrently (or previously passed) with this course.
Lecture: 3, Lab 0, Other 0

MECH-431 Dynamic Systems with Controls Lab 1 Credits
Corequisites: MECH-430
Prerequisites: MECH-330 and MECH-331 and MATH-305
This is the lab component accompanying the second course in System Dynamics. The objective of this course is to provide an understanding of basic principles of designing, implementing, and evaluating controls for dynamic systems. The application of material covered in MECH-430 is stressed, with both computational and equipment-based lab experiences designed to reinforce the lecture content. MECH-430 must be taken concurrently (or previously passed) with this course.
Lecture: 0, Lab 1, Other 0

MECH-435 Digital Twins and Model-Based Engineering 4 Credits
Prerequisites: MECH-300 and MECH-310
This course introduces the concept of digital twins for mechanical systems, focusing on finite element analysis (FEA), multibody dynamic simulations, and experimental testing, including data collection, correlation, and model updating. Students will develop digital twins using commercial software packages such as NX, Abaqus, ADAMS, LabVIEW, and MATLAB to model, simulate, and validate mechanical systems. The course covers the integration of sensor data, real-time monitoring, and predictive modeling to enhance system performance and optimize mechanical designs. Students will learn techniques for data assimilation, machine learning-driven model updates, and uncertainty quantification to create accurate and reliable digital twins. Practical applications will include structural health monitoring, mechanical analysis, and performance optimization in mechanical and automotive systems.
Lecture: 4, Lab 0, Other 0

MECH-440 Introduction to Internal Combustion Engines 4 Credits
Prerequisites: MECH-320
This course introduces the basic fundamentals of internal combustion engines and their operation. Topics covered include thermodynamic analysis of 4-stroke and 2-stroke cycles, spark ignition and compression ignition engines, intake systems, exhaust systems, fuel injection and moisture preparation, combustion, emissions, slider crank mechanism, vibrations, engine testing, and engine design. Recent technologies such as variable valve timing and lift, variable compression ratio, gasoline direct injection, homogeneous-charge compression ignition, turbocharging and supercharging of engines are also presented.
Lecture: 4, Lab 0, Other 0

MECH-441 Advanced Automotive Power Systems 4 Credits
Prerequisites: MECH-320
This course serves to expand student's knowledge of automotive power systems. Topics covered include, detailed thermodynamic cycle analysis of various power cycles, emerging alternative fuels and power systems for automotive use (current topics include high-blend alcohol/gasoline fuels, gasoline direct injections (GDI) engines, hybrid electronic Powertrains, and fuel-cells). Students are also expected to work on design projects which are determined by the instructor. Students are expected to work on projects leading to the development of presentations and/or technical papers for professional society meetings (i.e. SAE, Global Powertrain Congress, etc.).
Lecture: 4, Lab 0, Other 0

MECH-442 Chassis Systems 4 Credits
Prerequisites: MECH-330
The objective of this course is to provide a comprehensive experience in the area of automotive chassis engineering. The course covers tires, suspensions and steering. A vehicle system approach is used for learning. Vehicle dynamics concepts and improvement approaches are integrated into the course content. Professional computer-aided engineering tools are introduced (e.g. CarSim, SuspensionSim) and applied to the areas of suspension analysis and overall vehicle dynamics performance. Students work in teams to complete a chassis design project applicable to passenger cars or light trucks.
Lecture: 4, Lab 0, Other 0

MECH-443 Noise and Vibration 4 Credits
Prerequisites: MECH-310
This course introduces an integrated approach to noise and vibration analysis in automotive engineering and other fields. Techniques for evaluating the vibration and acoustic characteristics of vehicle systems are discussed. Principles of noise and vibration control are presented through automotive applications. Students will learn how to analyze free and forced vibration systems, including an introduction to signal processing. The course includes a discussion on experimental modal analysis, where students will explore techniques for identifying natural frequencies, mode shapes, and damping properties of structures through experimental data.
Lecture: 4, Lab 0, Other 0

MECH-444 Introduction to Automotive Powertrains 4 Credits
Corequisites: MECH-311
Prerequisites: MECH-212
An introduction to the performance of motor vehicle and the design of automotive power transmission systems. Topics covered include, loads on the vehicle, evaluation of various engine and vehicle drive ratios on acceleration performance and fuel economy, manual transmission design, and automatic transmission design.
Lecture: 4, Lab 0, Other 0

MECH-445 Hybrid Electric Vehicle Propulsion 4 Credits
Corequisites: MECH-430, MECH-431
Prerequisites: None
An introduction to the principles of hybrid electrical vehicle propulsion systems for Mechanical and Electrical Engineering students. A major emphasis of the course will be to broaden the mechanical engineering student's knowledge of electrical engineering so that he/she can understand the fundamentals of electrical motors, electrical motor controls, and electrical energy storage systems. The course is also intended to strengthen the knowledge of electrical engineering students relative to automotive powertrain design. With this background, the integration of these hybrid electric components into the hybrid electric vehicle powertrain system will be studied, including electric energy storage (batteries, flywheels, ultra-capacitors) and electrical energy production-fuel cells. Relevant codes and standards will be emphasized.
Lecture: 4, Lab 0, Other 0

MECH-446 Vehicle Systems Dynamics 4 Credits
Prerequisites: MECH-330
This course begins with an introduction to vehicle weight distribution and tire patch forces. Acceleration, braking, ride and handling concepts follow. Mathematical models for ride and handling are derived and presented. Chassis design factors (CDF) effects on ride and handling are emphasized. Computer simulation software (e.g. CarSim) is used as an integral part of the course and for projects assigned during the term. Overview of technology and latest developments in the field of vehicle dynamics (e.g. SAE publications) are part of the course.
Lecture: 4, Lab 0, Other 0

MECH-448 Vehicle Design Project 4 Credits
Prerequisites: MECH-493
Minimum Class Standing: Senior
This is the second course of the ME capstone design project. It provides a comprehensive engineering design experience in automotive engineering, structural systems, dynamic systems, or energy systems. Students will work in small teams on design and development projects in a classroom environment that is representative of a competitive workplace. Systems engineering disciplines and problem-solving techniques will be applied. The final design will be validated using a prototype with appropriate test methods and / or simulations to evaluate its performance, quality, cost, and environmental compliance. Design reviews in the form of class presentations and written reports are required throughout this course.
Lecture: 4, Lab 0, Other 0

MECH-450 Automotive Bioengineering: Occupant Protection and Safety 4 Credits
Prerequisites: MECH-310
A discussion and application of the following fundamental concepts: (1) an overview of Federal Motor Vehicle Safety Standards; (2) basic anatomy and physiology of the overall human body; (3) introduction to injury biomechanics including rate, load, and acceleration dependent injury mechanisms; (4) overview of injury prevention strategies including a variety of air bags, multipoint restraint systems, and occupant sensing methodologies; (5) the basic structure and function of anthropomorphic test devices; (6) introduction to experimental crash simulation; (7) virtual occupant simulation using MADYMO or similar computational tools.
Lecture: 4, Lab 0, Other 0

MECH-451 Vehicular Crash Dynamics and Accident Reconstruction 4 Credits
Prerequisites: MECH-310
A discussion and application of the following fundamental concepts: (1) 2D and 3D dynamics of vehicular crash, (2) application of linear and angular momentum principles to vehicular impact, (3) application of energy principle to vehicular impact, (4) estimation of crash energy from vehicular crush profile, (5) vehicular crash pulse analysis, (6) occupant kinematics, (7) dynamics of rollover and pole collision, (8) crash data recorder (CDR) analysis, (9) and special topics in accident investigation forensics.
Lecture: 4, Lab 0, Other 0

MECH-482 Mechanics and Design Simulation of Fiber-Reinforced Composite Materials 4 Credits
Prerequisites: MECH-300
The properties, mechanics, and design simulation aspects of fiber-reinforced composite materials are covered in this course. Topics include: constituents and interfacial bonding, microstructure and micromechanics, theory of anisotropy, classical laminate theory, material characterization, failure and damage, manufacturing techniques, composite structure design, and introduction of nanocomposite.
Lecture: 4, Lab 0, Other 0

MECH-490 Fluid Power Systems 4 Credits
Corequisites: MECH-312
Prerequisites: MECH-300
This course begins with basic hydraulics circuits followed by the sizing and control of hydraulic cylinders and motors. Prime movers are introduced and matched to system requirements. Valves are described while circuit tracing and component recognition are emphasized. The course also addresses air consumption, pneumatic component sizing and ladder logic. There will be limited consideration of hydraulic servo and two design projects.
Lecture: 4, Lab 2, Other 0

MECH-493 Senior Design 1 4 Credits
Prerequisites: MECH-300 and MECH-310 and MECH-312 and MECH-322
This is the first of two required courses for the ME capstone design project. The course prepares students to engage in design and decision-making using engineering knowledge while encouraging ingenuity. Students will work in small teams on a design project of their own choosing, or as assigned by the instructor. The primary objective is to develop a design proposal, including engineering specifications and a project plan. This is followed by initial design work with the goal of building, testing, and analyzing the design in the second capstone course.
Lecture: 4, Lab 0, Other 0

MECH-495 Senior Design Project 4 Credits
Prerequisites: MECH-493
Minimum Class Standing: Senior
This is the second course of the ME capstone design project. It provides a comprehensive engineering design experience in automotive engineering, structural systems, dynamic systems, or energy systems. Students will work in small teams on design and development projects in a classroom environment that is representative of a competitive workplace. Systems engineering disciplines and problem-solving techniques will be applied. The final design will be validated using a prototype with appropriate test methods and / or simulations to evaluate its performance, quality, cost, and environmental compliance. Design reviews in the form of class presentations and written reports are required throughout this course.
Lecture: 4, Lab 0, Other 0

MECH-498 Mechanical Eng Study Abroad 4 Credits
Prerequisites: None
Advanced Topics in Mechanical Engineering. This is a transfer course taken a part of Kettering's Study Abroad Program.
Lecture: 4, Lab 0, Other 0

MECH-523 Applied Computational Fluid Dynamics 4 Credits
Prerequisites: MECH-322 and (MATH-313 or MATH-418 or MATH-423)
This course includes solution methods to the Navier-Stokes equations in a discrete domain. Grid generation, coordinate transformation, discretization, explicit, implicit, semi-implicit, a variety of algorithms, post-processing, and interpretations of results are discussed. Solution techniques for compressible and incompressible flows, their applicability, robustness, and limitations are covered. External and internal flows with and without chemical reactions are also discussed. The learning process involves hands-on experience on grid generation, setting up a CFD code, post-processing, and a thorough discussion on the results. The students will work on a final project that is a practical problem of significant magnitude and importance to industry. This work must be publishable in the student's journal or presentable in a conference.
Lecture: 4, Lab 0, Other 0

MECH-564 Aerodynamics and Wing Theory 4 Credits
Prerequisites: MECH-322 and (MATH-305 or MECH-600)
Discussions on fundamentals of inviscid and viscous incompressible flows. Important topics in fluid mechanics such as potential flow, vortices, point sources, and coupling of inviscid and boundary layer flows are covered. Two and three dimensional wings (or airfoils) and some exact solutions to such flow problems are discussed. Semi-analytical methods for disturbance distribution on wings are introduced by perturbation method. The computational Panel method for two and three dimensional aerodynamics problems is discussed. Commercial computer programs are used to solve realistic problems in a three dimensional space.
Lecture: 4, Lab 0, Other 0

MECH-595 Automotive Seminar I 4 Credits
Prerequisites: None
Kettering has a partnership with the Society of Automotive Engineers (SAE) to offer both a certificate in Automotive Systems, as well as, a graduate degree in either Automotive Systems or the Mechanical Cognate. This seminar course would be comprised of a total of four Continuing Education Units (CEU) from SAE seminars, which have been reviewed and approved by a faculty review committee, consistent with Graduate academic policy. The transfer of credit must be supported by documentation from SAE for each individual applicant seeking such transfer.
Lecture: 4, Lab 0, Other 0

MECH-596 Automotive Seminar II 4 Credits
Prerequisites: None
Kettering has a partnership with the Society of Automotive Engineers (SAE) to offer both a certificate in Automotive Systems, as well as, a graduate degree in either Automotive Systems or the Mechanical Cognate. This seminar course would be comprised of a total of four Continuing Education Units (CEU) from SAE seminars, which have been reviewed and approved by a faculty review committee, consistent with Graduate academic policy. The transfer of credit must be supported by documentation from SAE for each individual applicant seeking such transfer.
Lecture: 4, Lab 0, Other 0

Medical (MEDI)

MEDI-100 Integrated Medical Terminology and Practice 4 Credits
Prerequisites: None
An introduction to the healthcare industry, covering the rationale for the medical scribe, the role of the electronic medical record in reimbursements and delivery of quality care, as well as medical ethics and practice in a clinical setting. Through experiential and service learning components, students will develop the literacy and communication skills needed for health professions with a team-based, patient centered approach.
Lecture: 0, Lab 0, Other 0

Philosophy (PHIL)

PHIL-374 Environmental Philosophy 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course introduces students to philosophical questions about the environment and peoples' relations to it. Topics include how far "sustainable" practices can go towards protecting the environment, the philosophical underpinnings of U. S. environmental laws, the different kinds of environmental racism found today, and the philosophical questions raised by human-caused climate change: who, for instance, is responsible for climate change and what actions ought to be taken in light of it? In considering these questions, students will learn to analyze the philosophical complexities of environmental issues and sharpen their logical reasoning.
Lecture: 4, Lab 0, Other 0

PHIL-378 Moral and Ethical Philosophy 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || A concentrated study of the origin and nature of standards of character (ethics) and behavior (morality). The history of these concepts will be explored through reading some of the standard philosophical literature. Attention will be given to the difficulties such concepts face in a world now defined by modern ideologies and institutions.
Lecture: 4, Lab 0, Other 0

PHIL-391 Philosophy Special Topics 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || An interdisciplinary advanced course focusing on a specific topic. This course is a one-time offering whose content is determined by current faculty interest, and provides a comprehensive and coherent examination of the chosen topic. This course may be repeated for credit under different topic
Lecture: 4, Lab 0, Other 0

Physics (PHYS)

PHYS-114 Newtonian Mechanics 3 Credits
Corequisites: MATH-102, PHYS-115
Prerequisites: MATH-101 or MATH-101X
A calculus-based introduction to classical Newtonian mechanics including; vectors, translational and rotational kinematics and dynamics, work, energy, impulse, and linear and angular momentum.
Lecture: 3, Lab 0, Other 1

PHYS-115 Newtonian Mechanics Laboratory 1 Credits
Corequisites: COMM-101, MATH-102, PHYS-114
Prerequisites: MATH-101 or MATH-101X
Laboratory activities will explore position, velocity, and acceleration, force, momentum and energy, all as function of time. Applications to vehicle crash safety are incorporated. Laboratory skills, including: uncertainty, simple data acquisition and sensor instrumentation, and analysis techniques are essential.
Lecture: 0, Lab 2, Other 0

PHYS-224 Electricity and Magnetism 3 Credits
Corequisites: MATH-203, PHYS-225
Prerequisites: PHYS-114 and PHYS-115 and (MATH-102 or MATH-102X or MATH-102H)
An investigation of the physics of electricity and magnetism with a focus on the physics of electric and magnetic fields and their effects on electric charges. Topics will include the relationships between charges, forces, fields, potentials, and currents, as well as the physics of capacitors, resistors, and inductors.
Lecture: 3, Lab 0, Other 1

PHYS-225 Electricity and Magnetism Laboratory 1 Credits
Corequisites: MATH-203, PHYS-224
Prerequisites: PHYS-114 and PHYS-115 and (MATH-102 or MATH-102X or MATH-102H)
This laboratory investigates the physics of electricity and magnetism. It includes a practical study of electric potential and electric current, as well as the fundamental circuit elements: capacitors, resistors, and inductors.
Lecture: 0, Lab 2, Other 0

PHYS-302 Vibration, Sound and Light 4 Credits
Corequisites: MATH-204
Prerequisites: PHYS-224 and PHYS-225 and (MATH-203 or MATH-203H or MATH-203X)
Minimum Class Standing: Sophomore 2
The phenomena of vibration and waves provide a fundamental background necessary to approach a wide variety of applications in physics and engineering. The first part of this course will introduce students to the basics of vibration, including the effects of real damping, response to driving forces, nonlinear oscillation and application to several acoustical, optical, electrical, and mechanical systems. After this introduction to vibration, the course will focus on wave motion. The behavior of non-dispersive waves in solids, acoustic sound waves, electromagnetic waves, and transverse waves on a string will be discussed along with an introduction to Fourier analysis as a means of analyzing wave signals. Non-dispersive waves in non-uniform media will also be explored with applications to several different types of waves occurring in nature. Basic wave phenomena including reflection, refraction, diffraction and interference will be discussed with respect to a variety of wave types. Students successfully completing this course will be well prepared for further study in optics, acoustics, vibration, and electromagnetic wave propagation.
Lecture: 4, Lab 0, Other 0

PHYS-304 The Science of Sensors 4 Credits
Prerequisites: PHYS-224 and PHYS-225
Sensors are a driving technology in nearly every industry. In this course, we will explore the "why's" and "how's" behind the operation of sensors in general, and then delve into the science behind your specific types of sensors work. The course will wrap up with a project in which students create their own sensing system using an Arduino microcontroller and multiple sensors to perform a task.
Lecture: 4, Lab 0, Other 0

PHYS-354 Medical Physics Principles 4 Credits
Prerequisites: PHYS-224 and PHYS-225
Minimum Class Standing: Sophomore
This course is designed to give physicists, engineers, chemists, pre-med students, and other technical majors an introduction to the application of physics in the field of medicine. Students will be introduced to the fundamental science and real-world application of diagnostic imaging, nuclear medicine, radiation therapy, and health physics. This course will cover topics such as radiation interactions with matter, the concept of radiation dose, the effect of radiation on biology, 2D x-ray imaging, computed tomography (CT) imaging, magnetic resonance imaging (MRI), ultrasound, biomedical optics, single photon emission computed tomography (SPECT), positron emission tomography (PET), and the treatment of cancer utilizing radiation therapy.
Lecture: 4, Lab 0, Other 0

PHYS-366 Quantum Physics 4 Credits
Prerequisites: PHYS-224 and PHYS-225
This course is an overview of the discoveries and applications of physics from the early 20th century on. Topics include quantum phenomena, wave-particle duality, quantum physics, solid state physics, semiconductors and superconductors.
Lecture: 4, Lab 0, Other 0

PHYS-376 Photonics and Optoelectronics 4 Credits
Prerequisites: PHYS-366
This course is an introduction to the fundamentals of photonics and semiconductor optoelectronics materials and devices, their principles of operation and their applications. The course provides the students with the broad background knowledge needed to operate in the semiconductor devices industry, with specific emphasis on semiconductor optoelectronic and photonic devices. The growing level of integration of traditional semiconductor electronic functions, on the one hand, and optics and photonics functions on the other hand, is central to this course. The course starts with the wave-particle duality of light and light phenomena. It then covers the basic electrical, optical and electro-optical properties of dielectrics, semiconductors and semiconductor structures beginning with the pn-junction. Practical devices discussed in the course include lasers, light-emitting diodes (LEDs) and laser diodes (LD), light detectors (photodiodes, silicon photomultipliers, CCD and CMOS imaging sensors), semiconductor light amplifiers, light modulators and photovoltaic devices. Silicon photonics and hybrid photonics-integrated-chips (PIC) will also be discussed in the context of increasing demands for higher data transmission capacity (bandwidth) and processing speeds for optical communications and AI.
Lecture: 4, Lab 0, Other 0

PHYS-388 Acoustics in the Human Environment 4 Credits
Prerequisites: PHYS-224 and PHYS-225
Minimum Class Standing: Junior
This course surveys elements in acoustics that involve human factors, including the physiology of hearing, psychoacoustics and sound quality metrics, and the basic signal processing needed for these metrics. Topics in architectural and room acoustics will also explore how we experience and control our acoustic environment. While the level of prerequisites and mathematical sophistication is intermediate, intense independent learning and academic maturity is expected. Computer software will be used to manipulate audio signals and understand processing that is often automated (and used carelessly). In this course, less emphasis will be placed on technical practice that may change. Instead, students will be challenged to understand why standards are written as they are, how metrics are designed, and how “rules of thumb” originated.
Lecture: 4, Lab 0, Other 0

PHYS-412 Theoretical Mechanics 4 Credits
Prerequisites: PHYS-114 and (MATH-204 or MATH-204H) and (EP-235 or MATH-305)
A look at classical physics. Topics include the projectile motion with air resistance, simple harmonic and nonlinear oscillation, central force motion, Kepler's laws and planetary motion, motion in noninertial reference frames, motion of systems of particles, rigid body motion, Lagrangian mechanics, and Hamiltonian theory. Computational methods for solving advanced physics problems will also be introduced.
Lecture: 4, Lab 0, Other 0

PHYS-452 Thermodynamics and Statistical Physics 4 Credits
Corequisites: MATH-204
Prerequisites: (MATH-203 or MATH-203X) and PHYS-224 and PHYS-225 and PHYS-366
Minimum Class Standing: Sophomore 2
Introduction to statistical approaches for the analysis of systems containing a large number of particles. Specific topics include the fundamentals of thermodynamics, conditions for equilibrium and stability, ensemble theory, non-interacting systems, and phase transitions.
Lecture: 4, Lab 0, Other 0

PHYS-462 Quantum Mechanics 4 Credits
Prerequisites: MATH-204 and (MATH-305 or MATH-307) and PHYS-366
Minimum Class Standing: Junior
Intoduction to the fundamentals of non-relativistic quantum mechanics. Topics include: photons, matter waves, the Bohr model, the time-independent Schrodinger equation (and its application to one dimensional potentials), quantization of angular momentum, spin, the hydrogen atom, multi-electron atoms, and perturbation theory.
Lecture: 4, Lab 0, Other 0

PHYS-465 Materials Characterization 4 Credits
Corequisites: EP-446
Prerequisites: PHYS-366
This course surveys optical and electrical techniques used in industry to characterize the physical and chemical properties of semiconductor materials. An overview of the analysis performed using data obtained from the Scanning Electron Microscope (SEM), Atomic Force Microscope (AFM), X-ray Photoemission Spectroscope (XPS), X-ray diffractometer (XRD), the Ellipsometer, Fourier Transform Infrared Spectrometer (FTIR) and Raman Spectrometer (RS) will be presented. The definition and characterization of some electrical properties of semiconductors such as resistivity, carrier concentration, mobility and carrier lifetimes will be discussed.
Lecture: 4, Lab 0, Other 0

PHYS-477 Optics and Lab 4 Credits
Prerequisites: (MATH-204 or MATH-204H) and PHYS-302
Minimum Class Standing: Junior
A study of geometrical and physical optics. Topics in geometrical optics include phenomena of reflection, refraction, total internal reflection and their application to imaging systems consisting of lenses and mirrors. Physical optics will start from the electromagnetic wave nature of light and will focus on such wave-like phenomena as optical interference, diffraction, polarization, and dispersion of light. Limited topics in interaction of light with matter, crystal optics, optical properties of materials and their applications in such areas as optoelectronics, photonics and fiber optics will also be addressed. The lab investigates optical component analysis, ray tracing, interferometry, diffraction, polarization, interference, optical fibers and other special topics.
Lecture: 3, Lab 2, Other 0

Psychology (PSYC)

PSYC-350 Cognitive Psychology 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course is designed to serve as an introduction to the field of Cognitive Psychology. It will introduce students to methods and applications that have been used to investigate brain processes and their functions. It will address concepts, theories, methods, and research findings in human information processing, particularly as they relate to attention, perception, memory, problem solving, decision making, language, and reasoning.
Lecture: 4, Lab 0, Other 0

Social Science (SSCI)

SSCI-310 The Flint Water Crisis 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course consists of a wide-ranging case study of the Flint Water Crisis. It examines the origins and significance of the crisis from a variety of angles, exploring questions of politics, economics, culture, science, and engineering. The course places special emphasis on the role that Flint residents themselves have played in the struggle for clean water in Flint, and on how their struggle relates to broader issues of democracy and environmental justice.
Lecture: 4, Lab 0, Other 0

SSCI-314 Technology and Sustainable Development 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course explores meaningful ways in which technology projects could be used to promote sustainable development in developing countries. Students will be introduced to concepts related to both development and sustainability and to a range of economic and social contexts in which development projects are implemented at the local and national levels. The course encourages interdisciplinary approaches to issues of sustainability, appropriate technology, and cultural awareness in selecting, designing, and implementing technologies for sustainable development.
Lecture: 4, Lab 0, Other 0

SSCI-391 Social Science Special Topics 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || An interdisciplinary advanced course focusing on a specific topic. This course is a one-time offering whose content is determined by current faculty interest, and provides a comprehensive and coherent examination of the chosen topic. This course may be repeated for credit under a different topic.
Lecture: 4, Lab 0, Other 0

SSCI-398 Social Science Study Abroad Advanced Topics 4 Credits
Prerequisites: None
Advanced Topics in the Social Sciences. This is a course taken as part of Kettering's Study Abroad Program.
Lecture: 4, Lab 0, Other 0

SSCI-499 Social Science Independent Study 4 Credits
Prerequisites: None
This course facilitates depth and breadth of study in a particular area of Social Sciences. This course may not serve as a substitute for any of the courses in the general education component, including the SSCI elective and senior seminar. Students must request and receive approval of the independent study topic with the instructor.
Lecture: 4, Lab 0, Other 0

Sociology (SOC)

SOC-331 Globalization in India and China: Comparative and Cross-Cultural Perspectives 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course will provide a broad overview of the socioeconomic, political, and cultural changes occurring in India and China-the two fastest growing economies of the world-and examine their implications for the United States. It will also introduce students to theoretical and empirical issues concerning globalization. The main objective of this course is to equip students to develop a nuanced understanding of the massive changes taking place in Asia in the context of globalization and appreciate the opportunities and challenges that come in their wake.
Lecture: 4, Lab 0, Other 0

SOC-333 Global Social Movements 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || One of the most exciting aspects of contemporary globalization is the emergence of a variety of transnational social movements. All over the world, civil society groups are asserting their rights concerning issues such as food security, the environment, energy, land rights, education and so on. This course will explore the main theoretical and empirical approaches to the study of social movements. It will also examine the various ways in which social movements across the globe have synergized their resources and strategies to collectively vindicate their rights. Drawing insights from major social movements in different parts of the world, this course will provide a nuanced understanding of why and how they arise and the extent to which they have been successful in accomplishing their objectives.
Lecture: 4, Lab 0, Other 0

SOC-337 Religion in Society 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || A study of the relationships between religion and society. A broad range of religious practices and beliefs selected from diverse human societies will be examined using social scientific perspectives.
Lecture: 4, Lab 0, Other 0

SOC-341 Law, Politics, and Society 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || This course will provide a broad overview of the myriad ways in which law, politics, and society intersect and how they influence each other. It will help students understand how laws are enacted, enforced, and adjudicated. Whose interests do law and legal institutions serve? What are the strengths and limitations of law in bringing about social change? How do social structures affect legislation and enforcement? How does the justice system deal with issues of race, class, gender, and ethnicity? Why is the justice system inaccessible to the poor? These are some of the questions that will be explored in this course. In addition, it will introduce students to the different theoretical perspectives through which socio-legal issues are understood. The main aim is to equip students with nuanced socio-legal sensibilities to comprehend and analyze complex issues of law, politics, and society.
Lecture: 4, Lab 0, Other 0

SOC-391 Sociology Special Topics 4 Credits
Prerequisites: None
Minimum Class Standing: Junior
Prerequisites: Two 200-level Liberal Arts Elective Courses || An interdisciplinary advanced course focusing on a specific topic. This course is a one-time offering whose content is determined by current faculty interest, and provides a comprehensive and coherent examination of the chosen topic. This course may be repeated for credit under different topic.
Lecture: 4, Lab 0, Other 0

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