

# TABLE OF CONTENTS

Graduate Catalog .....	2	Computer Science (CS) .....	47
About Kettering University .....	3	Elect. & Computer Engrg (ECE) .....	47
About the Catalog .....	6	Electrical Engineering (EE) .....	47
2018-19 Academic Calendar .....	7	Financial (FINC) .....	48
Graduate Level Academic Programs .....	9	Healthcare Management (HMGT) .....	48
College of Engineering (Graduate) .....	9	Indust/Manufctrng Engrg (IME) .....	48
MS in Engineering (Concentration in Automotive Systems) .....	10	Information Systems (ISYS) .....	49
MS in Engineering (Concentration in Computer Engineering) .....	10	Lean/Manufacturing Ops (MFGO) .....	50
MS in Engineering (Concentration in Electrical & Computer Engineering) .....	11	Management (MGMT) .....	50
MS in Engineering (Concentration in Electrical Engineering) .....	12	Marketing (MRKT) .....	52
MS in Engineering (Concentration in Mechanical Engineering) .....	12	Mechanical Engineering (MECH) .....	52
Graduate School & Research .....	13	Index .....	58
School of Management/grad/programs/coll-business/ .....	13		
Master of Business Administration (MBA) .....	13		
MS in Engineering Management .....	15		
MS in Lean Manufacturing .....	16		
MS in Operations Management .....	17		
Certificate Programs .....	19		
Global Leadership .....	19		
Healthcare Management .....	19		
Operations Management .....	19		
Supply Chain and ERP .....	19		
Course Descriptions & Numbering .....	20		
Graduate Admissions .....	21		
Tuition and Fees .....	24		
Academic Policies and Regulations .....	25		
Student Records .....	37		
Family Educational Rights and Privacy Act (FERPA) .....	37		
Information Technology .....	39		
Library Services .....	40		
Alumni Engagement .....	41		
Administration and Faculty .....	42		
Contact Information .....	44		
Courses A-Z .....	45		
Accounting (ACCT) .....	45		
Business (BUSN) .....	45		
Computer Engineering (CE) .....	45		

# GRADUATE CATALOG

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Kettering University offers graduate programs that cater to the needs of students, young professionals and those looking for a new challenge. Most Kettering graduate degrees can be obtained online (<http://catalog.kettering.edu/grad-online>) or on-campus. Those available on-campus are listed below:

- Master of Business Administration (MBA) (p. 13)
- MS Engineering (p. 10) Automotive Systems (p. 10)
- MS Engineering (p. 12) Electrical Engineering (p. 12)
- MS Engineering (p. 10) Computer Engineering (p. 10)
- MS (p. 15) Engineering Management (p. 15)
- MS Engineering in Mechanical Engineering (p. 12)
- MS (p. 17) Operations Management (p. 17)

Click [here](https://www.kettering.edu/graduate-admissions) for more information about admission requirements and deadlines (<https://www.kettering.edu/graduate-admissions>).

# ABOUT KETTERING UNIVERSITY

Kettering University is a national leader in experiential STEM (science, technology, engineering and math) and Business education, integrating an intense academic curriculum with applied professional experience. Through this proven approach we inspire students to realize their potential and advance their ideas by combining theory and practice better than any institution in the world. Kettering University is dedicated to achieving the extraordinary through technological innovation, leadership, and service.

## Mission, Vision, and Values

### Mission

Kettering University prepares students for lives of extraordinary leadership and service by linking transformative experiential learning opportunities to rigorous academic programs in engineering, science, mathematics, and business.

### Vision

Kettering University will be the first choice for students and all our partners seeking to make a better world through technological innovation, leadership and service.

### Values

*Respect:* for teamwork, honesty, encouragement, diversity, partnerships with students.

*Integrity:* including accountability, transparency and ethics.

*Creativity:* fostering flexibility and innovation.

*Collaboration:* across disciplines and with all partners.

*Excellence:* in all we do.

## Accreditation

Kettering University graduate programs are accredited by The Higher Learning Commission (<http://www.higherlearningcommission.org>). The Association of Collegiate Business Schools and Programs (ACBSP (<http://www.acbsp.org>)) accredits the Master of Business Administration (MBA) program.

## History

Originally founded as The School of Automotive Trades by Albert Sobey under the direction of the Industrial Fellowship of Flint on October 20, 1919, Kettering University has a long legacy with the automotive industry. The university became known as the Flint Institute of Technology in 1923 before being acquired by General Motors in 1926, becoming the General Motors Institute of Technology and eventually the General Motors Institute in 1932. Sometimes referred to as the "West Point of industry," GMI focused on creating business and industry leaders through a unique cooperative education model.

GM and the University separated on July 1, 1982, and the University became an independent private university, keeping the cooperative education model and expanding the number of co-op employers for students while also offering graduate programs.

The University's name officially became Kettering University on January 1, 1998, in honor of Charles Kettering (1876-1958), a distinguished engineer, inventor, scientist, social philosopher, and humanitarian.

Charles Kettering's belief that both theoretical knowledge and practical experience are necessary elements of an education made him a staunch advocate for cooperative education in the earliest years of the twentieth century.

While maintaining the cooperative education model it was founded on, Kettering University has expanded programmatic offerings, increased the number of corporate partners and employers to more than 550, and developed a reputation as one of the top applied research institutions in the country. Kettering University's programs and alumni outcomes are consistently among the most highly rated in the United States.

## 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 (<https://my.kettering.edu/page/what-title-ix>). 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 (<https://www2.ed.gov/about/offices/list/ocr/complaintintro.html>) or calling 800-421-3481.

### Learning Outcomes

- **Communication** – demonstrate effective communication to a diverse range of professional audiences

- **Research and analytical skills** – demonstrate the ability to collect and synthesize information in ways consistent with the highest professional standards
- **Ethics** – develop a framework that recognizes and chooses ethical courses of action
- **Leadership and teamwork** – exhibit professional integrity, ethical leadership, and effective collaboration skills
- **Global perspective** – contribute to a sustainable world as informed by a global perspective
- **Entrepreneurial Mindset** – possess the skills necessary for creative and innovative problem-solving, awareness of customer needs, and opportunity recognition

## Campus Facilities

The seven main buildings, Academic Building, Campus Center, the Connie & Jim John Recreation Center, C. S. Mott Engineering and Science Center, Frances Willson Thompson Hall, the Innovation Center and the University Corner Building, are set off by an attractively landscaped campus.

The Academic Building is the “historical” center of the campus. It houses classrooms, science laboratories, computer laboratories, the library, the Humanities Art Center, McKinnon Theatre, and instructional and administrative offices, comprising a total floor space of nearly 400,000 square feet.

The Campus Center is the “activity” center for the campus. It houses Kettering Dining Services, C-Store, BJ’s Lounge & Grill, the Wellness Center, television studios, WKUF, Financial Aid, Admissions, Campus Safety, a recycling center, student activities areas and other administrative offices.

Kettering’s 70,000 square foot Connie and Jim John Recreation Center, located just west of the Thompson Residence Hall, has a full complement of aerobic, strength, and sports amenities, in addition to student and alumni lounges, making it the likely focus of many student and alumni social and recreational activities. It houses a six-lane swimming pool, four multi-purpose regulation basketball courts, four racquetball courts, and a 1/8 mile suspended indoor track. Other areas include an aerobics/dance room, a free-weight room, and a fitness/exercise room that overlook the pool and gymnasium.

The C. S. Mott Engineering and Science Center has a total floor space of 130,000 square feet. The building houses Biochemistry, Chemistry, Mechanical Engineering, and alternative energy and automotive laboratories. Student project areas are provided, including the Autonomous Vehicle and SAE garages.

Frances Willson Thompson Hall is the on-campus residence facility for Kettering University. The facility has four floors, and is designed in a figure eight formation with two courtyards. It is divided into 17 units of 17-37 residents. Common spaces include multiple lounges/lobbies, computer labs, a community kitchen, a gaming area and laundry facilities. Each resident room is equipped with a single bed, desk and chair, wardrobe unit with shelves, and with a microwave/fridge. All rooms are air conditioned, heated and have access to telephone and internet. Most residents share a suite with another resident (two private rooms

connected by a door). Residents share community bathrooms, which are located at the intersections of each hallway.

Campus Village Apartments, although not Kettering-operated, are located on campus, and provide suite-style housing for over 200 upper-class students. Students wishing to explore the Campus Village living option should call the Campus Village rental office at (810) 232-4960.

The Innovation Center at Kettering University is an approximately 9,000 square foot multi-tenant laboratory facility that supports scientific and technologically-based “start-up” companies that have a need for dedicated research laboratories in the first three to four years of their existence. It consists of six laboratories that are capable of being divided into twelve intimate laboratories, private offices, a conference/training room, business center, break area and private shower facilities. The Innovation Center is the first Leadership in Energy and Environmental Design (LEED) Silver Certified building in Genesee County.

Einstein Bros. Bagels, located in the University Corner Building across from the Campus Center, provides students the option of eating breakfast and lunch using their meal plans. The 2,500 square-foot building also houses a Flint Police Service Station.

Kettering facilities are accessible to the handicapped. The majority of the campus buildings are inter-connected for ease of movement during inclement weather. Convenient parking is provided adjacent to all campus buildings.

## Harris Fields

Harris Fields, adjacent to the Recreation Center, is the 25 acre sports complex for use by Kettering students. The rectangular portion contains areas for two soccer fields or two flag football fields or two lacrosse fields. This section is lit by Musco Lighting, the premier sports lighting company in the world. Softball can be played on 4 fields, complete with backstops and crushed limestone infields. Lacrosse and soccer also utilize the outfields for club practices and games. Informal play, the popular IM Sports program and club sports all utilize Harris Fields. Students, faculty and staff are also active on the .62 mile (1K) walking/jogging path that circumscribes the sports fields.

The McKeachie picnic pavilion is a covered picnic area that features picnic tables, barbeque grilles, lighting and electrical power for student reserved or informal use. Adjacent to the pavilion are two sand volleyball courts that are very popular with students for IM play and pick up games. A synthetic grass golf green completes the outdoor recreational opportunities for students.

Numerous trees and shrubs have been planted and the complex is fenced in and the area bordering University Avenue features decorative fencing and brick columns offering a distinctive look to one of the entrances to campus. The entire complex provides a first class venue for student recreation.

The Flint River Trail is a paved trail running along the Flint River from downtown Flint to the northern edge of Flint and on to either Bluebell Beach or Stepping Stone Falls. The trail is almost continuously asphalt and is suitable for walking, jogging, and/or biking and passes through the Kettering campus.

## Atwood Stadium

Atwood Stadium (<https://www.kettering.edu/about/atwood-stadium>) has been an iconic landmark in the city of Flint for the past 85 years. Built on an old city dumpsite that was cleared by 3000 local volunteers

in a single day, it sits right in the heart of the Flint community. Atwood has played host to many high school football games, including the Flint Northern/Flint Central series. It has also been the venue of choice for large-scale community events, such as visits from President Franklin Delano Roosevelt in 1936 and presidential candidate John F. Kennedy in 1960. Today, activities include all levels of football, soccer, lacrosse, health fairs, band competitions, concerts and 10k road races.

In September 2013, Kettering University assumed ownership of the venerable stadium in order to keep the facility from closing. Kettering is committed to maintain the traditional community uses of the stadium in addition to providing a new venue for Kettering student recreational and academic events. In August 2015, the University completed a multi-million dollar restoration project funded by the University and several community partners. Renovations included replacement of the turf with a state-of-the-art turf field that rivals numerous professional and Division 1 stadiums, restroom and concession stand improvements, concrete and masonry restorations, upgrades to the locker rooms and press box, as well as stadium lighting and fencing.

### **The Kettering University Alumni Carillon (Bell Tower)**

The Bell Tower, also called Carillon, was erected as a part of the campus expansion in 1969, built with funds donated by GMI/Kettering Alumni and friends. At the dedication, it was noted that the structure would "serve as a dynamic symbol of identity between the alumni, students, and faculty". The carillon consists of 47 bells arranged in four octaves. The largest bell weighs nearly one ton while the smallest bell weighs only 20 pounds. The bells, made of 75 percent copper and 25 percent tin, were cast by the 200-year-old Petit & Fritsen Foundry of Aarle-Rixtel Netherlands. Designed by Tarapata-McMahon-Paulson Associates, the Kettering Carillon received the 1971 Honor Award for design from the Detroit Chapter of the American Institute of Architects.

## **ABOUT THE CATALOG**

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The online Kettering University catalog (Undergraduate, Graduate, Kettering University Online) reflects current academic policies, procedures, degree offerings, course descriptions, and other pertinent information. This digital version of the catalog is the official catalog of the University. The printed catalog is no longer the official catalog of the University, and in the case of any difference between the printed catalog and the online catalog, University officials will be guided by the online catalog.

The catalog should not be considered a binding contract between Kettering University and students, and the University reserves the right to make changes in curricula, degree requirements, course offerings, or academic policies at any time.



# 2018-19 ACADEMIC CALENDAR

This calendar also exists as a downloadable .pdf file on Kettering University's Academic Calendars Webpage (<https://my.kettering.edu/page/academic-calendars>).

Kettering University Academic Calendar 2018-2019									
All dates noted apply to both undergraduate and graduate classes - unless otherwise noted									
NOTE: Kettering University Online (KUO) does NOT use this calendar.									
Term	Week	Month	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Summer 2018		Jul	1	2	3	4	5	6	7
	1		8	9	10	11	12	13	14
	2		15	16	17	18	19	20	21
	3		22	23	24	25	26	27	28
	4	Aug	29	30	31	1	2	3	4
	5		5	6	7	8	9	10	11
	6		12	13	14	15	16	17	18
	7		19	20	21	22	23	24	25
	8	Sept	26	27	28	29	30	31	1
	9		2	3	4	5	6	7	8
	10		9	10	11	12	13	14	15
11		16	17	18	19	20	21	22	
			23	24	25	26	27	28	29
Fall 2018	1	Oct	30	1	2	3	4	5	6
	2		7	8	9	10	11	12	13
	3		14	15	16	17	18	19	20
	4		21	22	23	24	25	26	27
	5	Nov	28	29	30	31	1	2	3
	6		4	5	6	7	8	9	10
	7		11	12	13	14	15	16	17
	8		18	19	20	21	22	23	24
	9	Dec	25	26	27	28	29	30	1
	10		2	3	4	5	6	7	8
	11		9	10	11	12	13	14	15
Winter Break			16	17	18	19	20	21	22
			23	24	25	26	27	28	29
		Jan	30	31	1	2	3	4	5
Winter 2019	1		6	7	8	9	10	11	12
	2		13	14	15	16	17	18	19
	3		20	21	22	23	24	25	26
	4	Feb	27	28	29	30	31	1	2
	5		3	4	5	6	7	8	9
	6		10	11	12	13	14	15	16
	7		17	18	19	20	21	22	23
	8	Mar	24	25	26	27	28	1	2
	9		3	4	5	6	7	8	9
	10		10	11	12	13	14	15	16
	11		17	18	19	20	21	22	23
			24	25	26	27	28	29	30
Spring 2019	1	Apr	31	1	2	3	4	5	6
	2		7	8	9	10	11	12	13
	3		14	15	16	17	18	19	20
	4		21	22	23	24	25	26	27
	5	May	28	29	30	1	2	3	4
	6		5	6	7	8	9	10	11
	7		12	13	14	15	16	17	18
	8		19	20	21	22	23	24	25
	9	Jun	26	27	28	29	30	31	1
	10		2	3	4	5	6	7	8
	11		9	10	11	12	13	14	15
Summer Break			16	17	18	19	20	21	22
			23	24	25	26	27	28	29

  

Dates and Events	
Jul 5/5-8	A-section new student convocation/orientation
Jul 9/11	Classes begin/last day for add/drop
Aug 5	Last day for course withdrawal for partial refund
Aug 20 (12noon)	Undergraduate student midterm grades due
Aug 26	Last day for <i>undergraduate</i> course withdrawal - no refund
Aug 31-Sep 3	Labor Day Break (no classes)
Sept 16	Last day for <i>graduate</i> course withdrawal - no refund
Sept 18	Last day of classes (follow Friday schedule)
Sept 19	Reading day
Sept 20-22/22	Final exam period/term ends
Sept 28 (12noon)	Final grades due
Sept 27/27-30	B-section new student convocation/orientation
Oct 1	Classes begin
Oct 3	Last day for add/drop
Oct 28	Last day for course withdrawal for partial refund
Nov 12 (12noon)	Undergraduate student midterm grades due
Nov 18	Last day for <i>undergraduate</i> course withdrawal - no refund
Nov 22-25	Thanksgiving break (no classes)
Dec 9	Last day for <i>graduate</i> course withdrawal - no refund
Dec 10-11	Follow Thursday/Friday schedule
Dec 11/12	Last day of classes/reading day
Dec 13-15/15	Final exam period/term ends
Jan 2 (12noon)	Final grades due
Dec 16 - Jan 5	Winter break (no classes)
Jan 7	Classes begin/late registration and drop add
Jan 9	Last day for add/drop
Jan 21	Dr. Martin Luther King Jr. Day (no classes)
Feb 3	Last day for course withdrawal for partial refund
Feb 18 (12 noon)	Undergraduate student midterm grades due
Feb 24	Last day for <i>undergraduate</i> course withdrawal - no refund
Mar 1	No classes
Mar 17	Last day for <i>graduate</i> course withdrawal - no refund
Mar 19	Last day of classes (follow Friday schedule)
Mar 20	Reading day
Mar 21-23/23	Final exam period/term ends
Mar 29 (12noon)	Final grades due
Apr 1/3	Classes begin/last day for add/drop
Apr 28	Last day for course withdrawal for partial refund
May 13 (12noon)	Undergraduate student midterm grades due
May 19	Last day for <i>undergraduate</i> course withdrawal - no refund
May 27	Memorial Day break (no classes)
Jun 9	Last day for <i>graduate</i> course withdrawal - no refund
Jun 10	Last day of classes
Jun 11	Reading day
Jun 12-14/14	Final exam period/term ends
Jun 15	Commencement
Jun 21 (12noon)	Final grades due
Jun 16-Jul 6	Summer break (no classes)





# GRADUATE LEVEL ACADEMIC PROGRAMS

Kettering University's graduate programs include several Master degrees that are offered to both on and off campus students, either part-time or full-time. The Bachelor/Master option also allows Kettering University undergraduates to leverage approved courses toward a graduate degree.

Kettering University has been offering graduate programs since 1982. Each program is designed to prepare future leaders for a global workplace with 'first-class education that reflects the real world.' Many students are able to complete a program in less than two years. Our graduate programs leverage nationally-ranked faculty who are recognized for their commitment to practical education. Kettering University has long been admired by educational peers and businesses as a leader in developing top engineers and corporate managers.

## Master Degree Programs, Concentrations and Certificates

### Master of Business Administration (p. 13) (MBA)

#### Concentrations/Certificates:

Global Leadership (p. 19)

Healthcare Management (p. 19)

Operations Management (p. 19)

Supply Chain & ERP (p. 19)

### Master of Science in Engineering (MSEN), with a Concentration in:

Automotive Systems (p. 10)

Computer Engineering (p. 10)

Electrical Engineering (p. 12)

Mechanical Engineering (p. 12)

### Master of Science in Engineering Management (<https://online.kettering.edu/programs/masters/engineering-management-masters-online/?schoolsrc=42786>) (MSEM)

#### Certificates:

Global Leadership (p. 19)

Healthcare Management (p. 19)

Operations Management (p. 19)

Supply Chain & ERP (p. 19)

### Master of Science in Lean Manufacturing (<https://online.kettering.edu/programs/masters/lean-manufacturing-masters-online/?schoolsrc=42786>) (MSLM)

#### Certificates:

Global Leadership (p. 19)

Healthcare Management (p. 19)

Operations Management (p. 19)

Supply Chain & ERP (p. 19)

### Master of Science in Operations Management (<https://online.kettering.edu/programs/masters/operations-management-masters-degree-online/?schoolsrc=42786>) (MSOM)

#### Certificates:

Global Leadership (p. 19)

Healthcare Management (p. 19)

Operations Management (p. 19)

Supply Chain & ERP (p. 19)

### Master of Science in Supply Chain Management (<https://online.kettering.edu/programs/masters/masters-supply-chain-management-online>) (MSSC)

#### Certificate Programs

Global Leadership (<https://online.kettering.edu/programs/certificate/global-leadership/?schoolsrc=42786>)

Healthcare Management (<https://online.kettering.edu/programs/certificate/healthcare-management-online/?schoolsrc=42786>)

Operations Management (<https://online.kettering.edu/programs/certificate/operations-management/?schoolsrc=42786>)

Supply Chain & ERP (<https://online.kettering.edu/programs/certificate/supply-chain-management/?schoolsrc=42786>)

## College of Engineering (Graduate)

### Craig J. Hoff, Ph.D., P.E.

Dean of the College of Engineering

3-105 AB, 810-762-9856

coe@kettering.edu

### Graduate Programs

The Master of Science in Engineering (<https://www.kettering.edu/programs-and-degrees/on-campus-graduate>) is a professional master program that builds on an undergraduate engineering program by offering additional depth and greater mastery in a number of technical areas.

- The Automotive Systems (p. 10) specialty is intended for individuals who desire a deeper understanding and knowledge of the engineering operations of various systems on vehicles. Courses range from powertrain and engine components to design for safety and comfort. Students select courses that ensure a customized program that best meets their individual and career needs. This program has a thesis option.
- The Computer Engineering (p. 10) concentration is a research-intensive on-campus program designed to deepen students' understanding of computer engineering and to develop their skills in independent research. Courses within the computer engineering specialty include digital systems design, real-time embedded systems, mobile robotics and haptic systems. This program has a thesis requirement.

- The concentration in Electrical & Computer Engineering (p. 11) is designed for individuals who wish to acquire a deeper understanding and applied knowledge of engineering principles. This program affords a possibility for students to specialize in modern applications of electronics, electrical systems, and computer networking. In addition, the program provides an opportunity to learn business and financial management concepts which are valuable to practicing engineers. This program has a thesis option.
- The concentration in Electrical Engineering (p. 12) is a research-intensive on-campus program designed for individuals who wish to deepen their understanding of electrical engineering principles and applications and to develop their skills in independent research. Students study topics such as digital systems, electric machine design, fuel cell system integration and packaging, and robot dynamics and control. This program has a thesis requirement.
- The concentration in Mechanical Engineering (p. 12) program is designed for individuals who wish to deepen their understanding of mechanical engineering principles and applications and to develop their skills in independent research. Students can study a variety of topics including fuel cells, engineering optimization, green energy conversion, and mechanics of materials. This program has a thesis option.

## MS in Engineering (Concentration in Automotive Systems)

**Home Department:** Mechanical Engineering

**Program Advisor/Contact:**

Bassem Ramadan, Ph.D.  
Room 2-103 MC, 810-762-7992  
me@kettering.edu (bramadan@kettering.edu)

### Program Overview

The Master of Science in Engineering (<https://www.kettering.edu/programs-and-degrees/engineering-masters>) is a professional master's program that builds on an undergraduate engineering program by offering additional depth and greater mastery in a number of technical areas.

### Program Objectives

The **Automotive Systems** concentration is intended for individuals who desire a deeper understanding and knowledge of the engineering operations of various systems on vehicles. Courses range from powertrain and engine components to design for safety and comfort. Students select courses from a structured framework in order to customize a program that best meets their individual and career needs.

To receive the M.S. degree a student in the ME graduate program must complete 40 credit hours of graduate work. There are two plans to choose from:

- Plan A (consists of course work, research, and a thesis)
- Plan B (consists of only course work)

### SAE/Kettering University Partnership

Students who have up to eight (8) Continuing Education Units (CEU) from approved SAE seminars may be eligible to transfer those CEU's into the Automotive Systems Masters or Certificate program. For more

information you may contact Dr. Bassem Ramadan in the Mechanical Engineering Department.

## Program Curriculum Requirements

Completion of 40 credits as follows:

### Program of Study

#### Required Courses

MECH-600	Engineering Mathematics with Applications	4
Select at least four courses from the 500 level list below		16
Select at least five courses from the 600 level list below (or three courses and a Thesis)		20
Total Credit Hours		40

#### 500 Level Course Electives (Course prerequisites must be observed.)

MECH-526	Fuel Cell Science & Engineering	4
MECH-540	Introduction to Internal Combustion Engines and Automotive Power Systems	4
MECH-542	Chassis System Design	4
MECH-546	Vehicle Systems Dynamics	4
MECH-550	Automotive Bioengineering: Occupant Protection and Safety	4
MECH-551	Vehicular Crash Dynamics and Accident Reconstruction	4
MECH-5XX	One 500-level technical elective	4
MECH-541	Advanced Automotive Power Systems	4
MECH-544	Introduction to Automotive Powertrains	4
MECH-545	Hybrid Electric Vehicle Propulsion	4

#### 600 Level Course Electives (Course prerequisites must be observed.)

MECH-621	Applied Transport Phenomena	4
MECH-641	Combustion & Emissions	4
MECH-643	Noise, Vibration & Harshness	4
MECH-6XX	Two 600-level technical electives	8
Thesis		8

## MS in Engineering (Concentration in Computer Engineering)

**Home Department:** Electrical and Computer Engineering

**Available:** On Campus Only

**Program Advisor/Contact:**

Dr. Ravi Warriar  
810-762-7847  
rwarrior@kettering.edu (mcdonald@kettering.edu)

### Program Overview

The Master of Science in Engineering (<https://www.kettering.edu/programs-and-degrees/engineering-masters>) is a professional master's program that builds on an undergraduate engineering program by offering additional depth and greater mastery in a number of technical areas.

## Program Objectives

All graduates of the Master of Science in Engineering program will:

- Deepen their knowledge and increase their mastery of technical areas that match their personal career goals.
- Be better prepared to advance in positions of technical and/or managerial leadership.
- Develop their ability to sustain a life-long career in engineering, through continuing self-directed learning and professional development activities.

The Computer Engineering concentration is a research-intensive on-campus program designed for individuals who wish to deepen their understanding of computer engineering principles and applications and to develop their skills in independent research.

## Graduate Assistantship

Financial support, in the form of tuition reductions or waivers and stipends for living expenses, is available on a competitive basis. Students who receive financial support may be required to serve as research or teaching assistants for up to 20 hours per week (depending on the level of financial support) during terms in which they are registered.

## Program Curriculum Requirements

Completion of 40 credits as follows:

Select four of the following:	16
CE-612 Digital Systems Design	
CE-620 Microcomputer Systems	
CE-622 Computer Architecture and Organization	
CE-624 VLSI Design	
CE-626 Real-Time Embedded Systems	
CE-642 Mobile Robotics	
CE-672 Virtual Reality Systems: M&C	
CE-680 Computer Networks	
CE-684 Internet of Things (IoT)	
CE-691 Computer Engineering Special Topics	
CE-699 Computer Engineering Independent Study	
Two 500-600 graduate level elective courses	8
CE-695 Graduate Research in Computer Engineering	16
Completion and successful defense of a master's thesis	
<b>Total Credit Hours</b>	<b>40</b>

Undergraduate level coursework might also be required for some students as a prerequisite for either graduate-level coursework or research, depending on the student's background and the nature of the coursework or research. If required, undergraduate-level credit cannot be used to satisfy the graduate-level credit requirements given above.

The program operates on a calendar similar to a conventional quarter system: Fall, Winter, and Spring terms are 'regular' academic terms during which students normally enroll full-time, and the Summer term is optional. The nominal place of student calls for a total of six terms of study over 21 months.

First Year	Fall	8 credits coursework
First Year	Winter	8 credits coursework
First Year	Spring	8 credits coursework
	Summer	
Second Year	Fall	8 credits coursework
Second Year	Winter	8 credits coursework
Second Year	Spring	Thesis defense and submission

Many variations of this plan are possible. In particular, students may begin the program in any term, not just Fall, and may elect to register for coursework or research during Summer. Students may not, however, register for more than eight credits in a term.

## MS in Engineering (Concentration in Electrical & Computer Engineering)

**Home Department:** Electrical and Computer Engineering

**Available:** On Campus Only

**Program Advisor/Contact:**

Ravi Warriar, Ph.D.  
810-762-7847  
rwarrior@kettering.edu (kravi@kettering.edu)

## Program Overview

The Master of Science in Engineering (<https://www.kettering.edu/programs-and-degrees/engineering-masters>) is a professional master's program that builds on an undergraduate engineering program by offering additional depth and greater mastery in a number of technical areas.

## Program Objectives

All graduates of the Master of Science in Engineering program will:

- Deepen their knowledge and increase their mastery of technical areas that match their personal career goals.
- Be better prepared to advance in positions of technical and/or managerial leadership.
- Develop their ability to sustain a life-long career in engineering, through continuing self-directed learning and professional development activities.

The concentration in Electrical & Computer Engineering is designed for individuals who wish to acquire a deeper understanding and applied knowledge of engineering principles. This program affords a possibility for students to specialize in modern applications of electronics, electrical systems, and computer networking. In addition, the program provides an opportunity to learn business and financial management concepts which are valuable to practicing engineers. This program has a thesis option.

## Program Curriculum Requirements

Completion of 40 credits as follows:

ECE-610	Modeling of Dynamic Systems	4
ECE-630	Advanced Digital Signal Processing <sup>1</sup>	4
ECE-642	Electric Machine Drives <sup>1</sup>	4
ECE-648	Electromagnetic Compatibility <sup>1</sup>	4

EE-526	Advanced Power Electronics	4
EE-530	Digital Control Systems	4
EE-582	Robot Dynamics and Control	4
Select two of the following:		8
BUSN-659	International Business	
ECON-513	Microeconomic and Macroeconomic Concepts and Applications	
FINC-619	Financial Management	
Free Elective		4
Total Credit Hours		40

<sup>1</sup> A student may opt to do an MS thesis for four credits in lieu of a 600-level ECE elective.

## MS in Engineering (Concentration in Electrical Engineering)

**Home Department:** Electrical and Computer Engineering

**Available:** On Campus Only

**Program Advisor/Contact:**

Ravi Warriar, Ph.D.  
810-762-7847  
ece@kettering.edu

### Program Overview

The Master of Science in Engineering (<https://www.kettering.edu/programs-and-degrees/engineering-masters>) is a professional master's program that builds on an undergraduate engineering program by offering additional depth and greater mastery in a number of technical areas.

### Program Objectives

All graduates of the Master of Science in Engineering program will:

- Deepen their knowledge and increase their mastery of technical areas that match their personal career goals.
- Be better prepared to advance in positions of technical and/or managerial leadership.
- Develop their ability to sustain a life-long career in engineering, through continuing self-directed learning and professional development activities.

The concentration in Electrical Engineering is a research-intensive on-campus program designed for individuals who wish to deepen their understanding of electrical engineering principles and applications and to develop their skills in independent research.

### Graduate Assistantships

Financial support in the form of tuition reductions or waivers and stipends for living expenses is available on a competitive basis. Students who receive financial support may be required to serve as research or teaching assistants for up to 20 hours per week (depending on the level of financial support) during terms in which they are registered.

### Program Curriculum Requirements

Completion of 40 credits as follows:

ECE-610	Modeling of Dynamic Systems	4
Select three of the following:		12
CE-612	Digital Systems Design	
CE-624	VLSI Design	
ECE-630	Advanced Digital Signal Processing	
ECE-642	Electric Machine Drives	
ECE-648	Electromagnetic Compatibility	
EE-526	Advanced Power Electronics	
EE-530	Digital Control Systems	
EE-582	Robot Dynamics and Control	
EE-691	Graduate Special Topics in EE	
EE-699	Graduate Level Independent Study in Electrical Engineering	
Any 500-600 graduate level elective courses		8
EE-695	Graduate Research in Electrical Engineering	8
EE-695	Graduate Research in Electrical Engineering	8
Completion and successful defense of a master's thesis		
Total Credit Hours		40

Undergraduate-level coursework might also be required for some students as a prerequisite for either graduate-level coursework or research, depending on the student's background and the nature of the coursework or research. If required, undergraduate-level credit cannot be used to satisfy the graduate-level credit requirements given above.

The program operates on a calendar similar to a conventional quarter system: Fall, Winter, and Spring terms are "regular" academic terms during which students normally enroll full-time, and the Summer term is optional. The nominal plan of study calls for a total of six terms of study over 21 months:

First Year	Fall	8 credits coursework
First Year	Winter	8 credits coursework
First Year	Spring	8 credits coursework
	Summer	
Second Year	Fall	8 credits coursework
Second Year	Winter	8 credits coursework
Second Year	Spring	Thesis defense and submission

Many variations of this plan are possible. In particular, students may begin the program in any term, not just Fall, and may elect to register for coursework or research during Summer. Students may not, however, register for more than eight credits in a term.

## MS in Engineering (Concentration in Mechanical Engineering)

**Home Department:** Mechanical Engineering

**Available:** On Campus Only

**Program Advisor/Contact:**

Dr. Bassem Ramadan  
Room 2-103 MC, 810-762-7992

me@kettering.edu (bramadan@kettering.edu)

## Program Overview

The Master of Science in Engineering (<https://www.kettering.edu/programs-and-degrees/engineering-masters>) is a professional master's program that builds on an undergraduate engineering program by offering additional depth and greater mastery in a number of technical areas.

## Program Objectives

The **Mechanical Engineering** concentration is intended for individuals who desire a deeper understanding and knowledge of mechanical engineering as applied to various systems. Students select courses from a structured framework in order to customize a program that best meets their individual and career needs.

To receive the M.S. degree a student in the ME graduate program must complete 40 credit hours of graduate work. There are two plans to choose from:

- Plan A (consists of course work, research, and a thesis)
- Plan B (consists of only course work)

The student will receive a Master's degree upon completion of ten (10) courses within the program. This program has a thesis option.

## Mechanical Engineering Concentration Program Curriculum Requirements

Completion of 40 credits as follows:

### Program of Study

#### Required Courses

MECH-600	Engineering Mathematics with Applications	4
Select up to four courses from 500 level list below		16
Select at least five courses from the 600 level list below (Or three courses and Thesis)		20
Total Credit Hours		40

#### 500 Level Course Electives (Course prerequisites must be observed.)

MECH-516	Introduction to Finite Element Analysis with Structural Applications	4
MECH-526	Fuel Cell Science & Engineering	4
MECH-527	Energy and the Environment	4
MECH-528	Bio and Renewable Energy Lab	4
MECH-582	Mechanics and Design Simulation of Fiber-Reinforced Composite Materials	4
MECH-5XX	Two 500 Level Technical Electives	8

#### 600 Level Course Electives (Course prerequisites must be observed.)

MECH-610	Mechanics of Materials I: Linear Elasticity	4
MECH-611	Mechanics of Material II: Nonlinear Elastic-Plastic Behavior	4
MECH-615	Engineering Optimization	4
MECH-621	Applied Transport Phenomena	4

MECH-626	Hydrogen Generation, Storage and Safety	4
MECH-627	Green Energy Conversion	4
MECH-6XX	Two 600 Level Technical Electives	8
Thesis		8

## Graduate School & Research

### Scott W. Reeve, Ph.D.

Dean of the Graduate School & Sponsored Research  
4-945 CC, 810-762-9711, gsr@kettering.edu

#### Kettering University Graduate Learning Outcomes

In keeping with its mission, core values, and goals, Kettering University strives to ensure that graduates of its graduate degree programs achieve the following Graduate Learning Outcomes:

- **Communication** – demonstrate effective communication to a diverse range of professional audiences
- **Research and analytical skills** – demonstrate the ability to collect and synthesize information in ways consistent with the highest professional standards
- **Ethics** – develop a framework that recognizes and chooses ethical courses of action
- **Leadership and teamwork** – exhibit professional integrity, ethical leadership, and effective collaboration skills
- **Global perspective** – contribute to a sustainable world as informed by a global perspective
- **Entrepreneurial Mindset** – possess the skills necessary for creative and innovative problem-solving, awareness of customer needs, and opportunity recognition

## Master of Business Administration (MBA)

**Home Department:** School of Management (<https://my.kettering.edu/academics/departments/business>)

#### Program Advisor/Contact:

School of Management  
810-762-9630  
som@kettering.edu

### Program Overview

Kettering University's Master of Business Administration (MBA) (<https://online.kettering.edu/programs/masters/masters-business-administration-online/?schoolsrc=42786>) program provides students with an educational experience that enables graduates to perform as effective management professionals and leaders in modern organizations. The MBA consists of nine core courses (36 credit hours), and a concentration or Certificate. Students pursuing the MBA must select an area of concentration (three classes, 12 credit hours) that allows them to customize their MBA program to suit their professional needs and interests. Students may start this program in any term. Also, this program does not have a thesis option.



## School of Management Program Policies Pursuing a Second Master's Degree in the School of Management

The School of Management encourages interested graduates of Kettering University's MS and MBA programs to pursue a second master's degree subject to the following policies.

- Students pursue a single master's degree at a time. Students desiring a second master's degree must complete the application (<https://www.kettering.edu/graduate-admissions>) (<https://drive.google.com/file/d/0B8hhSHxvaasqMU9CeGpYU3o1YkU/view>).
- To earn a second master's degree, students must complete all degree requirements for the degree. In so doing, students must complete additional credit hours equal to a minimum of 40% of the second degree's requirements:
  - For MBA (or MS) graduates pursuing a 10 course MS degree – minimum of four additional courses (16 credits).
  - For MS graduates pursuing a 12 course MBA degree – minimum of five additional courses (20 credits).
- In order to gain maximum advantage from prior course work, graduates must apply for their second master's degree within three years of graduating from their first degree program. The admission committee will review applications beyond the three-year time limit to establish the relevancy of their course work. Students in this case may be required to complete more than 40% of the second degree's requirements.
- Students may request to transfer in a maximum of eight credits to Kettering University for use in their graduate studies. Pursuit of a second master's degree does not raise this limit. Transfer credit is only considered for courses with a grade of B or better.

### Co-op Work Experience

Co-op work experience is an optional experience for students in any graduate degree program in the School of Management, subject to the following policies. Co-op work experiences are not required for graduation in any graduate degree program. For more information on this program, please contact the School of Management at 810-762-9630, or [som@kettering.edu](mailto:som@kettering.edu)

- First term – Students can register for co-op work for up to one term after admission to the graduate program and prior to enrolling in their first graduate course.
- Subsequent terms – Students can register for up to two co-op work terms back to back during their graduate studies.
- Final term – Upon completion of course requirements, students can continue to register as a co-op student for one final term.

### Transfer Credits

The School of Management evaluates transfer credit consistent with other sections in this catalog. In addition, the department adheres to the following policies:

- Transfer credits cannot be more than two years old.
- Transfer credits must not have been used for a degree at another institution.
- Transfer credit is only considered for courses with a grade of B or better.

## Program Curriculum Requirements

The Curriculum for the MBA involves 12 courses totaling 48 credit hours including:

- nine core course for 36 credits, plus
- three concentration or certificate courses for 12 credits.

### Prerequisites

A foundational level of knowledge in critical areas is required prior to beginning the Master of Business Administration (MBA) program. This foundation helps to ensure that students are prepared to fully engage and succeed in the coursework associated with graduate programs in management. Students must have an undergraduate course in each of the following areas, complete MGMT-510 Foundations of Business, or test out of individual prerequisite courses through self-directed study.

Areas of prerequisite knowledge:

Economics

Managerial Accounting

Statistics

Management

Marketing

### Required Courses

ACCT-639	Managerial Accounting	4
BUSN-659	International Business	4
FINC-619	Financial Management	4
ISYS-669	Enterprise Information System Models	4
MGMT-639	Managing People & Organization	4
MGMT-659	Strategy	4
MGMT-661	Operations Management in Service Organizations	4
MRKT-679	Marketing Management	4
BUSN-779	MBA Capstone: Innovation & New Ventures	4
Total Credit Hours		36

## Concentrations & Certificates

### General Concentration

(This is a Concentration only.)

BUSN-689	Organizational Behavior	4
Select two 600-level or above electives from any graduate course in ISYS, IME, MFGO, or MGMT		8
<i>Credit Hours Subtotal:</i>		12

### Global Leadership Certificate

BUSN-689	Organizational Behavior	4
MGMT-649	Ethics and Leadership	4
MGMT-679	Leadership	4
<i>Credit Hours Subtotal:</i>		12

### Supply Chain & ERP Certificate

IME-652	Designing Value in the Supply Chain	4
IME-654	Enterprise Resource Planning	4
MGMT-669	Supply Chain Operations	4
<i>Credit Hours Subtotal:</i>		12

**Operations Management Certificate**

IME-676	Lean Six Sigma	4
MGMT-609	Technology Management	4
MGMT-619	Project and Change Management	4
<i>Credit Hours Subtotal:</i>		12

**Healthcare Management Certificate**

IME-656	Engineering for Healthcare Systems	4
IME-676	Lean Six Sigma	4
or MGMT-669	Supply Chain Operations	
HMGMT-609	Healthcare Management	4
<i>Credit Hours Subtotal:</i>		12

## MS in Engineering Management

**Home Department:** School of Management

**Program Academic Advisor/Contact:**

School of Management  
810-762-9630  
som@kettering.edu

### Program Overview

The Master of Science Engineering Management (<https://online.kettering.edu/programs/masters/engineering-management-masters-online/?schoolsrc=42786>) program blends education in traditional business topics with technical coursework in engineering. Enrollment is limited to graduates of ABET (<http://www.abet.org>) accredited engineering programs or Kettering University graduates with majors other than management or business.

The Bachelor/Master option is available to all KUO and on-campus Engineering Management students. Kettering University BS/MS rules apply. Students in the Kettering University BS/MS Program can **not** study abroad.

### School of Management Program Policies Pursuing a Second Masters Degree in the School of Management

The School of Management encourages interested graduates of Kettering University's MS and MBA programs to pursue a second master's degree subject to the following policies (effective July 1, 2010):

- Students pursue a single master's degree at a time. Students desiring a second master's degree must complete the appl (<https://online.kettering.edu/applying/?schoolsrc=42786>)ication (<https://drive.google.com/file/d/0B8hhSHxvaasqMU9CeGpYU3o1YkU/view>).
- To earn a second master's degree, students must complete all degree requirements for the degree. In so doing, students must complete additional credit hours equal to a minimum of 40% of the second degree's requirements:
  - For MBA (or MS) graduates pursuing a 10 course MS degree – minimum of four additional courses (16 credits).
  - For MS graduates pursuing a 12 course MBA degree – minimum of five additional courses (20 credits).
- In order to gain maximum advantage from prior work, graduates must apply for their second master's degree within three years of graduating from their first degree program. The admission committee will review applicants beyond the three-year time limit to establish the currency of their course work. Students in this case

may be required to complete more than 40% of the second degree's requirements.

- Students can transfer a maximum of 8 credits to Kettering University for use in their graduate studies. Pursuit of a second master's degree does not raise this limit.

### Transfer Credits

The School of Management evaluates transfer credits consistent with other sections in this catalog. In addition, the department adheres to the following policies:

- Transfer credits cannot be more than two years old.
- Transfer credits must not have been used for a degree at another institution.
- Transfer credit is only considered for courses with a grade of B or better.

### Prerequisites

A foundational level of knowledge in critical areas is required prior to beginning the Master of Science in Engineering Management (MSEM) program. This foundation helps to ensure that students are prepared to fully engage and succeed in the coursework associated with graduate programs in management. Students must have an undergraduate course in each of the following areas, complete MGMT-510 Foundations of Business, or test out of individual prerequisite courses through self-directed study.

Areas of prerequisite knowledge:

Economics

Managerial Accounting

Statistics

Management

Marketing

### Program Curriculum Requirements

Completion of 40 credits as follows:

MS in Engineering Management

**Required Courses**<sup>1,2</sup>

BUSN-659	International Business	4
FINC-619	Financial Management	4
IME-564	Ethics and Practice of Engineering	4
ISYS-669	Enterprise Information System Models	4
MGMT-639	Managing People & Organization	4
MGMT-659	Strategy	4
MRKT-679	Marketing Management	4
Total Credit Hours		28

**Global Leadership Certificate**<sup>3</sup>

BUSN-689	Organizational Behavior	4
MGMT-649	Ethics and Leadership	4
MGMT-679	Leadership	4
Total Credit Hours		12



**Operations Management Certificate**

IME-676	Lean Six Sigma	4
MGMT-609	Technology Management	4
MGMT-619	Project and Change Management	4
Total Credit Hours		12

**Supply Chain and ERP Certificate**

IME-652	Designing Value in the Supply Chain	4
IME-654	Enterprise Resource Planning	4
MGMT-669	Supply Chain Operations	4
Total Credit Hours		12

**Healthcare Management Certificate**

IME-656	Engineering for Healthcare Systems	4
IME-676	Lean Six Sigma	4
or MGMT-669	Supply Chain Operations	4
HMGT-609	Healthcare Management	4
Total Credit Hours		12

- Study Abroad credits cannot be applied to this core courses set.
- Students admitted to the Kettering BS/MS program can count up to two (2) 500-level courses taken as an undergraduate.
- Students affiliated with the SACM program are not allowed to enroll in this certificate.

The degree also has a study-abroad option that allows students to experience German culture and receive up to 16 credits of graduate course work.

## MS in Lean Manufacturing

**Home Department:** School of Management

**Available:** Only available through Kettering University Online (<https://online.kettering.edu/?schoolsrc=42786>).

**Program Advisor/Contact:**

Contact Kettering University Online  
kuonline@kettering.edu  
810.762.9827

## Program Overview

The Master of Science in Lean Manufacturing (<https://online.kettering.edu/programs/masters/lean-manufacturing-masters-online/?schoolsrc=42786>) program concentrates on the key elements of lean agile manufacturing operations. Students in this program can expect to complete in-depth studies of systems, processes and practices in manufacturing facilities. This discipline gives students exposure to many elements of manufacturing including lean production systems, work analysis, materials handling, quality systems, manufacturing and management metrics, as well as cutting-edge practices such as lean and agile manufacturing. The degree aims to enhance the student's technical skills with lean methodology and analysis techniques as well as management skills to complement their technical ability, enabling the student to take a broader perspective on the manufacturing industry as a whole.

## Program Educational Objective

- Develop and implement lean and competitive manufacturing facilities
- Apply appropriate quality systems tools
- Implement and evaluate suitable production control systems
- Identify and implement the requirements of a successful supply chain
- Develop a skill set to identify and manage 'change' effectively

## Program Outcomes

The program is intended for individuals in manufacturing who aspire to have a more comprehensive knowledge in lean and agile manufacturing operations and practices. Graduates of this program can expect to possess a thorough understanding of manufacturing methods, analytical methods to make decisions within a manufacturing facility, and innovation skills to adapt to changes within the global/cross-cultural environment. This program does not require a thesis.

## Prerequisite

An undergraduate course in statistics is required as a prerequisite to taking courses in the Master of Science in Lean Manufacturing program. For those students who do not have an undergraduate course in statistics, MGMT-522 Business Statistics is offered online to provide foundational understanding. The foundation in statistics is intended to prepare students to effectively participate and succeed in the coursework involved in this program.

## Program Curriculum Requirements

Completion of 40 credits as follows:

**Required Courses**

MFGO-601	Globally Integrated Manufacturing Company	4
MFGO-619	Six Sigma for Manufacturing	4
MFGO-633	Lean Production Systems	4
MFGO-635	Work Analysis for Lean Production Application	4
MFGO-639	Quality Assurance and Reliability	4
MFGO-649	Metrics for Lean Production Improvement	4
MFGO-659	Integrative Capstone Project	4

**Certificate**

Select three 4-credit courses in one of the Certificates listed below.	12
Total Credit Hours	40

## Global Leadership Certificate

BUSN-689	Organizational Behavior	4
MGMT-649	Ethics and Leadership	4
MGMT-679	Leadership	4
Total Credit Hours		12

## Operations Management Certificate

IME-676	Lean Six Sigma	4
MGMT-609	Technology Management	4

MGMT-619	Project and Change Management	4
Total Credit Hours		12

### Supply Chain and ERP Certificate

IME-652	Designing Value in the Supply Chain	4
IME-654	Enterprise Resource Planning	4
MGMT-669	Supply Chain Operations	4
Total Credit Hours		12

### Healthcare Management Certificate

IME-656	Engineering for Healthcare Systems	4
IME-676	Lean Six Sigma	4
or MGMT-669	Supply Chain Operations	
HMG-609	Healthcare Management	4
Total Credit Hours		12

## MS in Operations Management

**Home Department:** S ([https://my.kettering.edu/academics/departments/business/school\\_of\\_management](https://my.kettering.edu/academics/departments/business/school_of_management))

#### Program Advisor/Contact:

School of Management  
810-762-9630  
som@kettering.edu

### Program Overview

The Master of Science in Operations Management (MSOM) (<https://online.kettering.edu/programs/masters/operations-management-masters-degree-online/?schoolsrc=42786>) program focuses on the management skills, knowledge, and attitudes required to lead organizations that create goods and services. Students in this program will gain expertise in general business management areas, as well as a firm understanding of methods and practices in modern operations management. Students currently in this program possess a wide variety of backgrounds and undergraduate degrees. The School of Management designed this program for people who currently are in – or desire to enter – a management position within a manufacturing or services company. This program does not require a thesis.

## School of Management Policies

### Pursuing a Second Masters Degree in the School of Management

The School of Management encourages interested graduates of Kettering University's MS and MBA programs to pursue a second master's degree subject to the following policies (effective July 1, 2010):

- Students pursue a single master's degree at a time. Students desiring a second master's degree must complete the application (<https://drive.google.com/file/d/0B8hhSHxvaasqMU9CeGpYU3o1YkU/view>).
- To earn a second master's degree, students must complete all degree requirements for the degree. In so doing, students must complete additional credit hours equal to a minimum of 40% of the second degree's requirements:
  - For MBA (or MS) graduates pursuing a 10 course MS degree – a minimum of four additional courses (16 credits).

- For MS graduates pursuing a 12 course MBA degree – a minimum of five additional courses (20 credits).
- In order to gain maximum advantage from prior work, graduates must apply for their second master's degree within three years of graduating from their first degree program. The admission committee will review applicants beyond the three-year time limit to establish the currency of their course work. Students in this case may be required to complete more than 40% of the second degree's requirements.
- Students can transfer a maximum of 8 credits to Kettering University for use in their graduate studies. Pursuit of a second master's degree does not raise this limit.

### Transfer Credits

The Department of Business evaluates transfer credits consistent with other sections in this catalog. In addition, the department adheres to the following policies:

- Transfer credits cannot be more than two years old.
- Transfer credits must not have been used for a degree at another institution.
- Transfer credit is only considered for courses with a grade of B or better.

### Prerequisites

A foundational level of knowledge in critical areas is required prior to beginning the Master of Science in Operations Management (MSOM) program. This foundation helps to ensure that students are prepared to fully engage and succeed in the coursework associated with graduate programs in management. Students must have an undergraduate course in each of the following areas, complete MGMT-510 Foundations of Business, or test out of individual prerequisite courses through self-directed study.

Areas of prerequisite knowledge:

Economics

Managerial Accounting

Statistics

Management

Marketing

## Program Curriculum Requirements

Completion of 40 credits as follows:

### Program of Study - MS in Operations Management

#### Required Courses

FINC-619	Financial Management	4
ISYS-669	Enterprise Information System Models	4
MGMT-629	Management Science	4
MGMT-639	Managing People & Organization	4
MGMT-659	Strategy	4
MGMT-661	Operations Management in Service Organizations	4
MRKT-679	Marketing Management	4

#### Certificate

Select three (3) 4-credit courses in one of the certificate areas listed. <sup>1</sup>	12
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Total Credit Hours	40
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**Global Leadership Certificate<sup>2</sup>**

BUSN-689	Organizational Behavior	4
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MGMT-649	Ethics and Leadership	4
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MGMT-679	Leadership	4
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Total Credit Hours	12
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**Operations Management Certificate**

IME-676	Lean Six Sigma	4
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MGMT-609	Technology Management	4
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MGMT-619	Project and Change Management	4
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Total Credit Hours	12
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**Supply Chain and ERP Certificate**

IME-652	Designing Value in the Supply Chain	4
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IME-654	Enterprise Resource Planning	4
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MGMT-669	Supply Chain Operations	4
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Total Credit Hours	12
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**Healthcare Management Certificate**

IME-656	Engineering for Healthcare Systems	4
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IME-676	Lean Six Sigma	4
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or MGMT-669	Supply Chain Operations	4
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HMGT-609	Healthcare Management	4
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Total Credit Hours	12
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<sup>1</sup> Students admitted to the Kettering BS/MS program can count up to two (2) 500-level courses taken as an undergraduate. In addition, students need an additional 600-level course for a total of three (3) courses.

<sup>2</sup> Students affiliated with the SACM program are not allowed to enroll in this certificate.

# CERTIFICATE PROGRAMS

Kettering University has designed a set of graduate certificate programs for students that want to update their skill set in a new area of study. For students who do not have a graduate degree in hand, a graduate certificate can be the beginning of work toward a master's degree. For students who already hold a master's degree, a certificate program can provide graduate level education in an additional area of concentration.

## Certificate Programs

- **Global Leadership**
  - Overview (<https://online.kettering.edu/programs/certificate/global-leadership/?schoolsrc=42786>) Curriculum (p. 19)
- **Healthcare Management**
  - Overview (<https://online.kettering.edu/programs/certificate/healthcare-management-online/?schoolsrc=42786>) Curriculum (p. 19)
- **Operations Management**
  - Overview (<https://online.kettering.edu/programs/certificate/operations-management/?schoolsrc=42786>) Curriculum (p. 19)
- **Supply Chain & ERP**
  - Overview (<https://online.kettering.edu/programs/certificate/supply-chain-management/?schoolsrc=42786>) Curriculum (p. 19)

Students must meet admission requirements for a graduate program to be accepted to the graduate certificate.

Prerequisite requirements must be met for the courses in a certificate program or must be waived by the offering department. If prerequisites are waived for the certificate program and the student decides to pursue a complete graduate degree, there may be prerequisites required for a complete program admission.

Graduate tuition will be paid for graduate certificate programs. Students may take classes online or on-campus as available.

## Global Leadership

School of Management

**Admissions basis: MBA/MSOM/MSEM/MSLM**

Overview of the Global Leadership Certificate (<https://online.kettering.edu/programs/certificate/global-leadership/?schoolsrc=42786>)

BUSN-689	Organizational Behavior
MGMT-649	Ethics and Leadership
MGMT-679	Leadership

## Healthcare Management

School of Management

**Admissions basis: MBA/MSOM/MSEM/MSLM**

Overview of the Healthcare Management Certificate (<https://online.kettering.edu/programs/certificate/healthcare-management-online/?schoolsrc=42786>)

**Total Required Credits: 12**

HMGT-609	Healthcare Management	4
IME-656	Engineering for Healthcare Systems	4
IME-676	Lean Six Sigma	4
or MGMT-669	Supply Chain Operations	

## Operations Management

School of Management

**Admissions basis: MBA /MSOM/MSEM/MSLM**

IME-676	Lean Six Sigma	4
MGMT-609	Technology Management	4
MGMT-619	Project and Change Management	4

## Supply Chain and ERP

School of Management

**Admissions basis: MBA/MSOM/MSEM/MSLM**

IME-654	Enterprise Resource Planning	4
IME-652	Designing Value in the Supply Chain	4
MGMT-669	Supply Chain Operations	4

# COURSE DESCRIPTIONS & NUMBERING

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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 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).

The course numbers **591 and 691** shall be used to describe special topics courses. 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 **597 and 697** shall be used to admit credit for transfer or guest courses that are not equivalent to existing Kettering courses within a discipline. These course numbers are not used for study abroad transfer credit.

The course numbers **598 and 698** shall be used to describe transfer courses taken as part of a Kettering University International Studies Program.

The course numbers **599 and 699** shall be used to 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.

# GRADUATE ADMISSIONS

To be admitted into Kettering University as a Graduate Student, a prospective student must select a graduate degree program, fulfill all specific admission requirements as laid out for each graduate degree program, complete an online application, and arrange for official transcripts to be sent to Kettering University from all universities/colleges previously attended, either electronically or by mail. A Bachelor degree from a regionally accredited U.S. university/college, or its international equivalent, is required for acceptance into a graduate program.

Admission into a graduate program is offered after the application process is complete, and has been appropriately evaluated. Applications will not be reviewed before completion and all necessary documents are received. Applicants will be notified of the admission decision. If granted program admission, the student may then proceed to register for classes and matriculate. 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.

Kettering University has rolling admissions. Applications may be submitted at any time. Program start dates will be determined based on date of acceptance and program availability. Not all programs allow admission every term - see specific program description.

## Admission Requirements

### Grade Point Average

Regular admission requires an individual to possess a minimum undergraduate overall grade point averages of 3.0 on a 4.0 Grading System, or international equivalent.

### Transcripts

All students applying for admission must submit an official copy of their undergraduate transcripts from an accredited U.S. college or university. An official transcript is an unopened, original transcript received directly from the previous college by Kettering University. International students may be asked to submit a credential evaluation, in such cases, the evaluating body must be a member of the National Association of Credential Evaluation Services (NACES). This evaluation will be at the expense of the student. Kettering University undergraduate students do not need to submit their Kettering transcripts, but are required to submit transcripts from any other university.

### Graduate Programs

The following Master Degree programs are available on-campus at Kettering University:

**Master of Business Administration (MBA) – with concentrations**  
**Master of Science in Engineering (MS) – with concentrations**  
**Master of Science in Engineering Management (MS)**  
**Master of Science in Operations Management (MS)**

### Additional program requirements:

#### MS in Engineering Applicants

MS in Engineering applicants must submit a completed application, two letters of recommendation, official transcripts of their Bachelor's degree in an engineering discipline from an ABET-accredited program,

or international equivalent. Engineering Technology degrees will not be considered for the Engineering programs.

GRE General Section is also required for applicants to the MS Engineering programs. GRE scores more than five years old are not valid. Kettering University's institution code is 1246. If asked to choose a department code, please choose the one that best fits your intended program. All scores are sent directly to the Admissions Office regardless of the department code selected. For graduates of Kettering University the GRE requirement will be waived.

#### MS in Engineering Management Applicants

Engineering Management applicants must have a Bachelor of Science degree in Engineering from an approved ABET-accredited engineering (not technology) or computing program, or be a Kettering University graduate with a degree other than management or business.

#### MS in Operations Management Applicants

Operations Management applicants must submit official transcripts of their Bachelor's degree from a regionally-accredited U.S. university, or international equivalent.

#### MBA, Engineering Management and Operations Management Applicants

Students entering these programs must have completed specific prerequisite undergraduate courses. These courses must have been passed with a C or better. Applicants who do not have this background may either complete the required prerequisite courses through Kettering University, or demonstrate their knowledge by successfully passing appropriate qualifying exams.

Contact the School of Management, about the qualifying exam, at [som@kettering.edu](mailto:som@kettering.edu)

## Domestic Applicants

If you are a citizen or Permanent Resident of the United States, use the admissions checklist below to assist you in completing your admission packet. Refer to the specific degree program admission requirements in this catalog to ensure that you include all necessary materials for your desired program.

- **Application for Admissions**  
Apply online ([https://ketteringuniversity.force.com/tx\\_communitieshome](https://ketteringuniversity.force.com/tx_communitieshome)): There is no application fee for applicants.
- **Official Transcripts**  
Request all official transcripts (unopened, original transcripts from all undergraduate studies) to be sent directly from your previous college/university to Kettering University Admissions Office. Engineering applicants must possess a degree in an engineering discipline from an ABET-accredited program. Engineering Technology degrees will not be considered for engineering programs.
- **Letters of Recommendation**  
Two letters of recommendation are required for the MS Engineering programs.
- **GRE General Section Test** is required for the MS Engineering programs.
- **Resume' (optional)**

Submit electronically or mail information to:

[admissions@kettering.edu](mailto:admissions@kettering.edu)

Admissions Office  
Kettering University



1700 University Avenue  
Flint, MI 48504-6214

## Notification of Admission

Applicants will be notified by email of the Admissions Committee's decision. Once Kettering University has received your application and all supporting documents, please allow approximately four weeks for processing and to receive notification.

## International Applicants

Please follow these instructions if you are not a citizen or Permanent Resident of the United States. This convenient checklist can assist you in completing your admissions packet. To ensure that you include all necessary materials for your desired program, refer to the specific degree program admission requirements in this catalog. A final admission decision can only be made for students who have completed their undergraduate program.

- **Application for Admissions**  
Apply online ([https://ketteringuniversity.force.com/tx\\_communitieshome](https://ketteringuniversity.force.com/tx_communitieshome)): There is no application fee for applicants.
- **Official Transcripts**  
Students must request all official transcripts be sent directly to Kettering University from all previously attended colleges/universities. The minimum Grade Point Average (GPA) for admission is 3.0 on a 4.0 scale, or the international equivalent. Engineering and Engineering Management program applicants must possess a degree in an engineering discipline from an ABET-accredited program, or international equivalent.
- **Credential Evaluation** A Course-by-Course credential evaluation of undergraduate transcripts may be requested from students who obtained their Bachelor's degree outside the U.S. All fees for this service are the responsibility of the student. Kettering accepts evaluations from companies recognized by the National Association of Credential Evaluating Services (NACES).
- **Copy first page of passport**  
All application packets should contain a copy of the prospective student's passport, if available.
- **English Language Proficiency**  
Applicants whose native language is not English and who have not earned a Bachelor's degree from a U.S. institution are required to take TOEFL, International English Language Testing System (IELTS), MELAB (offered by University of Michigan), or complete level 112 at an approved ELS center. Please have official scores sent to Kettering University's Office of Admissions, Code 1246. Photocopies will not be accepted. Our minimum score requirements are: TOEFL: Paper-based: 550, Computer-based: 213, Internet-based: 79; IELTS: Minimum Band score of 6.0; MELAB: 76
- **Statement of Financial Support On Campus Programs**  
International student applicants must document their ability to meet all educational expenses for the entire period of intended study. Students will need to provide an Affidavit of Financial Support.
- **Letter of Recommendation**  
Two letters of recommendation are required for the MS in Engineering programs.
- **GRE General Section Test** is required for the MS Engineering programs.
- **Resume (optional)**

Mail information to:

Admissions Office  
Kettering University  
1700 University Avenue  
Flint, MI 48504-6214

[admissions@kettering.edu](mailto:admissions@kettering.edu)

## International Students Notification of Admission

International Applicants will be notified by email of the Admission Committee's decision. Once all materials are received at Kettering University, please allow approximately four weeks for processing your application and to receive notification.

Note: This decision simply grants or denies admission into the graduate program. Issuing an I-20 is a separate process and may require additional information. For information regarding the I-20 process, contact the Office of International Programs at [international@kettering.edu](mailto:international@kettering.edu) or (810) 762-9801.

## Financial Aid

Some financial aid programs may exist for graduate students. Students who contemplate applying for financial aid should contact the Financial Aid Office for more information at: 800-955-4464 ext. 7859 or [finaid@kettering.edu](mailto:finaid@kettering.edu).

### Financial Aid Eligibility

- Must be at least half-time or more to be considered for aid
- Certificate courses are not eligible for aid - cost of certificate course is not included in the Cost of Attendance when determining financial aid package
- Students who receive tuition assistance or reimbursement from their employer should contact their financial aid advisor

### Cost of Attendance (COA)

- COA values are based on assumed enrollment for the academic year.

### Federal Direct Loan

There are two types of Federal Direct Loans that graduate students may receive:

1. **Direct Unsubsidized Loans** – Eligible students may borrow up to \$20,500 per school year
2. **Direct PLUS Loans** – Eligible graduate students who need to borrow more than the maximum unsubsidized loan amounts to meet their education costs may apply for a PLUS loan. A credit check will be performed during the application process.

In order to qualify for the Direct Loan, students must first complete the FAFSA (Free Application for Federal Student Aid) and submit all requested documents to the Financial Aid Office.

International students do not qualify for U.S. Federal loans.

### Alternative Loans

Alternative loans (private student loans offered by various lenders) are another source of financing your educational costs. These loans are based on credit approval, and interest begins accruing upon disbursement of the loan. Each loan has different terms, borrowing limits, interest rates, and other special criteria. Additional



information on alternative loans can be found on this website (<https://choice.fastproducts.org/FastChoice/home/226200/1>).

## International Applicants for On-Campus Programs

Neither scholarship funds nor financial aid through Kettering University are available for international students.

International applicants must demonstrate and provide evidence of their ability to meet all educational and living expenses (tuition, room and board, etc.) for the entire period of their intended stay before Kettering University can issue a Certificate of Visa Eligibility (Form I-20). Evidence may include a statement from a legitimate financial institution reflecting a minimum of \$47,424 (U.S. dollars) in a savings account to pay expenses while attending Kettering University. Medical insurance, including repatriation and evacuation coverage, is required for all international students and must be purchased through Kettering University.

Funds remitted or provided for payment must be drawn from a U.S. Bank.

## Graduate Assistantship for On Campus Programs

The Kettering University Graduate Assistantship (GA) program was established to meet the following goals:

- Develop strong bonds between graduate students and faculty;
- Support the research enterprise and instructional mission;
- Prepare graduate students for productive careers;
- Provide financial support for graduate students.

GA's are assigned to work with an individual faculty member performing duties such as grading, assisting in a faculty member's teaching/research lab, or supporting a student technical team. In addition, all GA's are required to participate in and complete training modules offered by the Graduate School as part of the appointment.

To be eligible for the GA program, students must be currently admitted and in good academic standing or have accepted admission to an on-campus graduate program. GA appointments are competitively awarded subject to the availability of program funding.

If you are interested in applying for the Kettering GA program, please contact the Graduate School at [gsr@kettering.edu](mailto:gsr@kettering.edu) for more information.

## Graduate Satisfactory Academic Progress (SAP)

In order to receive Student Financial Aid under the programs authorized by Title IV of the Higher Education Act, as amended, a student must be maintaining satisfactory academic progress in the course of study that he/she is pursuing.

**Minimum cumulative grade-point average (GPA):** Graduate students must maintain a minimum cumulative GPA of 3.0

**Maximum time frame for degree completion:** For degree completion, students who exceed 150% of the normal period to complete their academic programs are not eligible for additional Title IV assistance for the period that is in excess of 150% of the academic period normally required to complete the program of study.

## Financial Aid Warning

Graduate students will be evaluated at the end of each academic term to determine if the student is meeting the standards described above. Graduate students who fail to meet the minimum 3.0 cumulative grade point average standard will be placed on Financial Aid Warning for the subsequent semester/period of enrollment. Financial aid can be received during the semester/term of warning. Financial aid disbursement for the next period of enrollment will be held until grades have been reviewed for the warning semester/period of enrollment of Financial Aid Warning; he/she must successfully complete the term without any failures, incompletes, or withdrawals.

## Financial Aid Suspension

The Financial Aid Office will review the records of students who are on financial aid warning at the end of the term that are placed on warning. If the student is still not meeting the minimum cumulative grade point average (3.0), the student will forfeit eligibility for all federal and institutional financial aid programs.

Financial aid will be suspended until the student successfully meets the cumulative grade point average standards. The student is responsible for paying his/her own expenses, such as tuition, fees, books, supplies, etc. and will not be reimbursed for the period(s) of financial aid suspension.

## Right to Appeal

Students have the right to appeal any decision of ineligibility to continue to receive financial assistance unless they have previously been granted an appeal. Appeals must be filed within 30 days of notification that aid eligibility has been lost.

An appeal should be based upon some unusual situation or condition which prevented you from passing more of your courses, or which necessitated that you withdraw from classes. Examples of possible situations include documented serious illness, severe injury, or death of a family member.

# TUITION AND FEES

## Expenses

The current tuition, fees, and charges are listed below. The Student Accounts Office sends an email notification to your Kettering email when your official bill is ready to view on Banner Web/Self Service.

We have teamed with Nelnet Business Solutions (NBS) to enable you to pay your education expenses through an online payment site - NBS Payments. NBS gives you the option of making a single payment or to sign up for a payment plan. Payments are processed via direct debit from a bank account or credit card. Please visit NBS Payments (<https://my.kettering.edu/nbs>) for more information.

A \$40 late fee and a financial hold will be added to all accounts which have not been settled in full by the end of each academic term.

## Tuition for the 2018-2019 Academic Year

Graduate Tuition (per credit hour)	\$912
2-credit course	\$1,824
4-credit course	\$3,648

## Business Related Fees

NSF Check Processing Fee	\$25
Graduate Late Payment Fee	\$40
Graduate Credit by Proficiency Exam Fee	\$30
Graduate Transfer or Credit Posting Fee (per credit hour)	\$5
Graduate Graduation Fee	\$160
Graduate Enrollment Deposit	\$350

When registering via the web, students acknowledge enrollment in the course(s) selected and authorize Kettering University to bill for any related tuition and fees. Payment is due the first day your course begins. A 'hold' will be placed on the account at the end of each academic term for those students who have not paid their tuition, submitted a voucher, or enrolled in the NBS payment plan—this prohibits future course registrations and may cause course cancellations and result in a late fee, and grade reports and transcripts being withheld.

## Employer Assistance

Many employers provide financial assistance for graduate study. Programs differ, so interested students should contact the appropriate office at their place of employment. Depending on company policy, Kettering University may be able to bill the employer directly for tuition. Students whose tuition is to be billed to their employers must submit complete and proper authorization from the employer to Kettering University. Students should apply for their employer tuition assistance as soon as possible – since costs and course offerings are known in advance. **Any portion of tuition that will not be paid by the employer must be paid by the student.** Kettering University will hold the student responsible for payments not received from the employer.

## Tuition Refund Policy for On Campus Programs

Course withdrawals and associated refunds are initiated by completing a Graduate Program Course Withdrawal Form (<https://my.kettering.edu/page/registrar-forms-and-procedures>) and submitting it the Office of the

Registrar for processing. The date the form is received in the Office of the Registrar determines the refund amount. Students are personally responsible for submitting the forms and verifying their receipt by the University. Refunds are made to the payer of the tuition. Click here (<https://my.kettering.edu/academics/academic-resources/office-registrar/academic-calendars>) for a calendar of specific refund dates for each term.

When a student withdraws from a course, refunds are made on the following schedule:

Week 1	100%
Week 2	75%
Week 3	50%
Week 4	25%
Week 5	0%

NOTE: Kettering University Online (KUO) has a different Refund Schedule.

# ACADEMIC POLICIES AND REGULATIONS

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All faculty and students are urged to review and understand the University's Academic Policies and Regulations. This section is 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 sections of the catalog, when necessary. Each section also concludes with the name of the official or office to contact with questions.

## Academic Advising

Academic advising represents a shared relationship between the student and his/her academic advisor and a process of continuous improvement, clarification and evaluation with the aim of assisting the student in achieving his/her goals. Each academic department has established its own system for facilitating advising processes as well as a representative academic program. In addition to following the representative program, students are encouraged to communicate regularly with an academic advisor to discuss academic matters, to determine progress toward degree completion, and to ensure that prerequisites have been satisfied and other departmental requirements have been met.

Questions: Contact the degree/program department

## Academic Standing Provisional Admission

Provisional Admission is a temporary status, which allows students to demonstrate their readiness for graduate work. A graduate student who has been granted provisional admission will be granted full admission after completion of their first two courses with a grade of 3.0 or better. Failure to complete the first two courses with a grade of 3.0 or better may result in dismissal from the program.

The criteria for provisional admission is uniquely determined by the departmental admission committee, and in some cases collateral work may be required from the applicant to confirm their readiness for a specific program.

## Probation

A graduate student whose cumulative grade point average falls below a 3.0 is automatically placed on academic probation. Probationary status is removed only when a graduate student's cumulative GPA equals or exceeds the minimum of 3.0 required to earn a Master's degree.

A graduate student who remains on probation after completing 12 credit hours since being placed on probation may be dismissed from the program. A probationary student whose cumulative GPA falls below 2.5 will automatically be dismissed from the graduate program. Such dismissals may be appealed to the Graduate Council. Advisement regarding the appeal process to return after academic dismissal is provided through the Graduate School.

## Separation

A student may be separated from the University if he/she fails to demonstrate progress toward the degree by successfully completing a class within any consecutive two year period.

## Appeal Process to Return after Academic Dismissal

After the academic dismissal process, students may appeal to the Graduate Academic Review Committee for readmission by submitting a letter of appeal to the Graduate Council via the Graduate School one term prior to the term in which they are seeking re-admittance.

This letter of appeal for re-admittance must state the cause(s) of the student's academic problems, changes in the student's situation that may rectify those problems and a proposed plan of action to ensure success in the Graduate School. Students are readmitted on a probationary status for one term.

Decisions of the Graduate Council are final.

Questions: Contact the Graduate School at [gsr@kettering.edu](mailto:gsr@kettering.edu)

## Disability Services

Kettering University provides disability services in compliance with the American with Disabilities Act (1990) and its amendments, along with state and local regulations regarding students, employees, and applicants with disabilities. Under these laws, no qualified individual with a disability shall be denied access to participation in services, programs, and/or activities at Kettering University. In carrying out Kettering's policy regarding disabled students, employees and applicants, we recognize mobility, sensory, medical, psychological, and learning disabilities. We attempt to provide reasonable accommodations for these disabilities for all students who meet the criteria described in the Americans with Disabilities Act.

Any Kettering student who has been diagnosed with a physical, medical, psychological, or learning disability, or suspects that s/he may have one, must contact the Wellness Center. The staff will evaluate the required documentation in support of the claim of disability and make an assessment of a student's needs on a case-by-case basis. The Wellness Center will then determine the appropriate services and accommodations necessary to meet the legal requirements as required by law. The Center will inform faculty and staff who may be responsible for providing the services and/or accommodations. Each term, students must meet with each professor to arrange individual accommodations.

Prospective students in the admissions process should contact the Wellness Center as soon as possible to discuss appropriate documentation needed to verify a disability and to identify the type of services, accommodations, and adaptive equipment that may be necessary.

## Testing Accommodations

The Academic Success Center (ASC) provides an alternative testing environment for students who are approved by faculty to take make-up tests or who receive testing accommodations. Testing accommodations allow students to get extended test time, individual testing space, and/or readers/scribes. The individual testing accommodations provided by ASC are approved and strictly dictated by the Wellness Center.

## Active Status

Students are expected to enroll in their first class within a year of their acceptance term. Students who do not enroll within that year will have their enrollment status changed to "inactive". As a consequence, the student may need to reapply to the degree program.

**Note:** Students may also have their status changed to "inactive" if there is a lapse in course enrollment for more than two years. If inactivated,

the student will need to contact the registrar's office to apply (<https://drive.google.com/file/d/0B8hhSHxvaasqb2FadnRhYWtWcmM/view>) for readmission to the degree program.

### **Last Known Date of Attendance Reporting:**

Kettering University does not require faculty to take attendance. The U.S. Department of Education requires the Financial Aid Office to differentiate students who fail a class because they quit attending from those who fail a class based on merit. Because a student could be a financial aid applicant at any point during the academic year, this information must be collected on all students, so that financial aid eligibility can be accurately determined.

The Last Known Date of Attendance Reporting Policy is necessary to appropriately assess the financial liability for students, ensure good stewardship of financial aid funds, and limit the financial liability for the university and academic consequences for the student. The amount of funds earned by a student is based on the amount of time spent in attendance by the student for that term. In addition, this information is often useful in arbitrating cases when students believe they completed the process to drop or withdraw from a course.

After the drop/add period each term, a 'last date of attendance' notification, or 'never attended' notification by a faculty member will result in the automatic assignment of either a WN (withdrawal for non-attendance) grade or an FN (failure for non-attendance) grade by the Registrar's Office. This initiates re-evaluation of a student's financial aid and it will be adjusted for those classes.

### **Student Responsibility**

Students are expected to attend all the sessions of the classes in which they are enrolled. Students who stop attending classes should immediately withdraw from those course(s) prior to the course withdrawal deadline specified on the academic calendar. Students who do not officially withdraw from a course they are not attending may be reported by their instructor as having a 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 associated with the last date of attendance reported and the assignment of the WN or FN grade.

### **School Responsibility**

After the drop/add period each term, a last date of attendance reporting by a faculty member will result in that automatic assignment of either a grade of WN (withdrawal for non-attendance) or FN (failure for non-attendance) by the Registrar's Office as follows:

- 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 will 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 will be included in a student's term and overall GPA.
- Once a faculty member has reported a last date of attendance, the student will no longer be able to attend or participate in the class.

### **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.

### **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 a transcript with the grade AU (audit) and no credits earned. 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.

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 (<https://drive.google.com/file/d/0B8hhSHxvaasqQTVXNkNsOW5NR3M/view>), have it signed by the course instructor, and submit it to the Office of the Registrar during the drop/add period specified on the academic calendar. Audits cannot be charged to a regular enrollment after the drop/add period noted on the academic calendar.

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.

Auditing of Online courses offered through Kettering University Online is not allowed.

## Bachelor/Master Program

This option is available only to Kettering University undergraduate students entering the MBA, Operations Management, Engineering or Engineering Management graduate programs.

Kettering University undergraduate students who desire to obtain a master's degree may elect to apply to the Bachelor/Master Program which provides students an opportunity to accelerate the process in which they earn both a bachelor's degree and a master's degree. This program is only available to Kettering University undergraduate students and leverages Kettering University's premier academic programs. Students who are admitted into the Bachelor/Master Program will complete the same total number of Co-op work terms as conventional non-Bachelor/Master undergraduate students.

### Option 1: Undergraduate (BBA/BS) Thesis

- Students must apply before graduating (after completing 120 credit hours) or within six (6) years after obtaining their undergraduate degree.
- The student completes the undergraduate degree, with the traditional undergraduate thesis (BS), and received the bachelor's degree at the conventional time.
- Up to eight (8) credits of 500-level courses, completed at the undergraduate level, and for which a grade of B or better was earned, are also applied to the master's degree. (Mechanical Engineering capstone courses do not apply.)
- Forty (40) credits remain to complete the MBA (total of 48 graduate credits) or thirty-two (32) credits remain to complete the master of science degree (total of 40 graduate credits). As an option, four (4) of these credits can be granted for an MS thesis.

### Option 2: Graduate Thesis Only: No Undergraduate Thesis

- Students must apply before starting their undergraduate thesis (i.e., before submitting their PTA).
- Eight (8) credits granted for the graduate-level thesis, four are applied to the undergraduate degree and four are applied to the graduate degree.
- The student will not receive the bachelor's degree until completion of the graduate-level thesis.
- Up to eight (8) credits of 500-level courses, which were completed at the undergraduate level, and for which a grade of B or better was earned, are also applied to the master's degree.
- One course (four credits) will be waived in the graduate program.
- Twenty-eight (28) credits remain to complete the master's degree (a total of 36 graduate credits).
- The MS thesis will be a more purely academic thesis driven by the faculty, but must be authorized by the student sponsor.

### Grade Requirements for Program Admission

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 MBA and MS 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.

## Questions:

- For MS Engineering options, please contact Dr. Bassem Ramadan at 810-762-9928 or bramadan@kettering.edu (rechempa@kettering.edu)
- For the MBA option, please contact the School of Management at som@kettering.edu

## Concentrations

A concentration is a specialized area of study within a major 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 must notify the Office of the Registrar to have it added to their record.

Question: Contact the Office of the Registrar

## Curriculum Restrictions

A student may take no more than four (4) courses numbered below 600-level to count toward their Master's degree.

Questions: Contact the Program Advisor

## 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 one of the official ways Kettering University faculty and staff communicate to 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, fewer features, and may hinder you to reply directly to the original email source.

Due to the proliferation of spam and phishing emails, be advised that you may receive emails that may request 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 you to provide information such as passwords. Be cautious regarding any unsolicited email as it may contain elements that would prove to be detrimental to your computer.

Questions: Contact Information Technology

## Enrollment Status/Verifications

Enrollment Verifications ([https://docs.google.com/document/d/1\\_rGUVSXEiSqbAI3ScfDlzPY0L\\_niVnRGWoC5HxLRIQ/edit?usp=sharing](https://docs.google.com/document/d/1_rGUVSXEiSqbAI3ScfDlzPY0L_niVnRGWoC5HxLRIQ/edit?usp=sharing)) may be obtained through the Office of the Registrar. Enrollment verifications confirm a student's enrollment status (full-time, half-time, less than half-time) and expected graduation date. Listed below are the graduate level enrollment statuses at Kettering University:



## Enrollment Status

8 or more credits or THS1 or THS2 = Full Time

4-7 credits = Half Time

1-3 credits or THS3 = Less Than Half Time

Questions: Contact the Office of the Registrar

## Grades

Course grades are available after each term via Banner Web. Federal law prohibits communication of grades by telephone. Students may access their grade report and/or print a grade report to provide to their company by logging on to Banner Web.

Grade	Description	Points
A	Outstanding	4.0
A-	Outstanding	3.7
B+	Satisfactory	3.3
B	Satisfactory	3.0
B-	Satisfactory	2.7
C+	Less than satisfactory	2.3
C	Less than satisfactory	2.0
C-	Less than satisfactory	1.7
F	Fail	0.0
AU	Audit	0.0
CR	Credit	0.0
FN	Failure for non-attendance	0.0
I	Incomplete	0.0
W	Withdrawal	0.0
WN	Withdrawn for non-attendance	0.0

## Course Hours and Points Definitions

Quality Points = Grade x Credit Hours

GPA = Quality Points ÷ GPA Hours

**Attempted hours (AHRS)** – are 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 a measure of the student load.

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

**Grade Point Average (GPA)** – is 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)** – are equal to the credit hour value of the course and are 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)** – are a 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 [KUO] 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 [KUO] 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 Changes

Grades (except incompletes) reported by an instructor are considered permanent and final. However, requests for a change of grade after an instructor reports final grade will be honored to correct an error in calculating or assigning that grade. To facilitate this process, the instructor will submit to the Registrar a grade change form, noting the rationale for the change, and what retroactive correction is to be made. This form must be countersigned by the instructor's department head. 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.

## 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.
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 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 Associate 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 Associate 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 Associate 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

## Graduation Requirements

Students must apply to graduate (<https://my.kettering.edu/content/graduate-application-graduate>) to begin the graduation process. The time-frame to submit this application is when registering for your last term of courses.

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

- Successfully complete all prescribed courses within the six (6) year limit. A student who anticipates not meeting the time limit must notify the Graduate Office at least six (6) months prior to the expiration of the six (6) year limit.
- Achieve a final cumulative grade-point average (GPA) of 3.0 or higher.

## Financial Obligations

Diplomas and transcripts are withheld until the student has satisfied all financial obligations with the University.

## Final Degree Verification Letter

A final letter is sent to the student 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.

## Degree Completion for Inactive Students with Coursework Remaining

Inactive students who wish to return to Kettering University must contact the Registrar's Office for assistance. After ensuring there are no outstanding financial obligations to the university, the Registrar will refer such students to the appropriate Academic Department Head or Discipline Chair to develop a plan of study. The final plan will be filed in the departmental office and in the student's permanent file in the Registrar's Office. These students will be subject to meeting the requirements for degrees in effect at the time of readmission.

## Commencement

Commencement is the formal ceremony which recognizes and celebrates graduates and graduation candidates. At Kettering University, commencement is held annually at the conclusion of the spring term. Refer to the published academic calendar for the date of commencement. Detailed information (<https://my.kettering.edu/page/graduation>) including eligibility requirements is available on the Office of the Registrar website.

Questions: Contact the Office of the Registrar

## Incomplete Grades For On Campus Programs

The grade of 'I' (Incomplete) may be issued by an instructor for any course in which the instructor deems that the work has not been completed and that it would be fair and equitable to allow the student additional time to complete the work. The conditions and terms for completion of the course are mutually agreed upon by the instructor and the student. The deadline for completion is at the discretion of the instructor but is not to exceed six months from the last day of the term in which the student was registered for the course. If a final grade is not submitted within six months, 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.

The incomplete grade may be extended by the instructor for up to an additional six months, or one calendar year from the end of the term in which the student was registered for the course. To initiate an extension, the instructor will notify the Office of the Registrar in writing. The instructor is under no obligation to grant an extension. If a final grade is not submitted within the six month extension period, 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.



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. The form will be filed in the Office of the Registrar as official documentation of the agreement.

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 the other course until the incomplete grade has been changed to reflect a passing grade. Prerequisite overrides are granted at the discretion of the department head for the course.

Questions: Contact the Office of the Registrar

## 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 rests 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/Directed 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 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. This is done by completing an Independent/Directed Study Form stating the course number 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.

Questions: Contact the department offering the course

## Graduate Program Extension Policy

Overly long times-to-degree are costly to both students and the University, for a variety of reasons. Indeed, timely progress is a sign of intellectual vigor, competence and commitment. Therefore, students have up to six years to complete all requirements for the Master's degree at Kettering University. If a student cannot complete the degree within the six-year time limit, they must request an extension. To be considered eligible for a time extension, the student must 1) demonstrate satisfactory progress towards the completion of the degree and 2) receive endorsement or approval from the Graduate Program Advisor and/or the Department Head.

Items that must be addressed on the **Time Extension Request** include:

1. The reasons for the request.
2. An explanation of how the student's circumstances have changed to enable them to complete the degree now.
3. An agreed upon plan and timeline for completion of the degree.

If approved, the student must complete the program requirements as outlined on the approved Program Time Extension form. During the extension, the student must meet with the Program Director periodically to ensure that adequate progress towards degree completion is being maintained.

## Appeal Process

If the Graduate Program Advisor and/or Department Head will not approve a request for extension, the student may appeal to the Graduate School. In such cases, the Graduate Dean will confer with the Graduate Council to examine the extension request. If the Graduate School is not able to approve the request, the student may make a final appeal to the Provost.

Questions: Contact the Graduate School at [gsr@kettering.edu](mailto:gsr@kettering.edu)

## Readmission to Kettering University

Students who were academically eligible to continue when they became inactive or withdrew may request readmission by contacting the Office of the Registrar.

Questions: Contact the Office of the Registrar

## Registration

Registration is the process by which a student enrolls in a specific course(s) during a specific term. Registration for courses occurs after the application/admission process is complete and the student has been granted admission. Students cannot receive credit for a course for which they have not registered. Students must register for courses every term they wish to take classes.

### Course Selection

Selection of courses is each student's own responsibility. The student is personally responsible for being aware of prerequisite coursework and choosing program courses accordingly. To assist with your planning, program curricula is available online or in this catalog for each Kettering graduate program. Since many of our degree programs are designed for people who have full-time jobs, a normal term course load is one or two courses. Kettering University advises against heavier loads except for resident students who are not employed. The responsibility for deciding how many courses to take in a term is solely the student's.

### Registration: On Campus Graduate Students

Students must register online via Banner Web. Registration instructions can be found on the Office of the Registrar website.

Students registered for courses will receive an e-mail notification to their Kettering e-mail account with instructions on how to log into Banner Web to retrieve their official invoice. This invoice will confirm enrollment and denote the required tuition. Detailed payment information will be in the email and on the invoice. Payments can be made online or by mail.

## 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 (above 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 (<https://drive.google.com/file/d/0B8hhSHxvaasqVmh2Y3RsTjIRUUU/view>) 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 or above 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 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 do the following:

- Complete and receive instructional department and degree department approvals on the Undergraduate Request to take Graduate Course Form (<https://drive.google.com/file/d/0B8hhSHxvaasqVmh2Y3RsTjIRUUU/view>) and submit the form to Registrar's Office for proper registration.
- Enroll as a guest student.

Questions: Contact the Office of the Registrar

## Repeating a Course

A student who receives a failing grade must retake the course if it is required for their program. Both grades will appear on the transcript but only the second grade is used in the computation of the cumulative grade point average. A student may repeat a course only once to improve his/her cumulative grade point average.

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 Bachelor/Master policy guidelines.

Questions: Contact the Office of the Registrar

## Student Grievance Procedures

A grievance is a written or verbal expression of dissatisfaction or formal allegation against the university, its units, its employees (including faculty and staff), and/or its students.

### Harassment and Discrimination

For grievances related to harassment or discrimination in the learning or work environment, refer to the Student Life section of the undergraduate catalog, under Student Conduct, below.

### Other Grievances

Currently enrolled students who have a grievance or issue should first try to work out the issue informally by discussing it in an honest and constructive manner with those persons most involved. Many grievances can be resolved when a student makes an effort to honestly communicate his/her frustrations or concerns. If a student has a grievance 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 grievances that the student cannot resolve informally with the parties involved, the student should contact either the Dean of Students (for non-academic-related issues) or the Associate Provost for Assessment & Academic Support (for academic-related issues).

## 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 Vice President of Student Life & Dean of Students.

### 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 Vice President of Student Life & Dean of Students. 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 the University's policies and procedures.

## 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 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 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.

## Code of Student Conduct

Conduct for which students may be subject to judicial 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's.
- Unauthorized entry to, use of, or occupancy of Kettering University facilities or a co-op employer's.
- Any dishonesty, cheating, forgery, plagiarism, or 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.
- 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 on Kettering's campus; any underage possession or use of alcohol.
- Failure to comply with directions of Kettering University or co-op employer officials acting in 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.

## Student Rights and Responsibilities Provided by Kettering University

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 misconduct 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.
- Right to present defense witnesses whose presences has been requested, in writing, at least 48 hours prior to an Administrative Hearing or University Board of Student Conduct.
- All hearings will be closed. Hearing results will be held in confidence, except that the Vice President of Student Life & Dean of Students 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- 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) (<https://my.kettering.edu/page/ferpa-family-educational-rights-and-privacy-act>).

## Resolution Options

### Administrative Hearing

In cases where charges do not appear to merit suspension or expulsion, or in cases which the accused does not contest the charges, the Vice President of Student Life & Dean of Students may designate an Administrative Hearing Officer (AHO), usually the Associate Dean of Students. The AHO will investigate the case and conduct a hearing with the accused. Administrative Hearings accommodate all those rights and procedures accorded to students by the University's misconduct policies.

Following the hearing, the AHO will provide the student with written notification of the results of the hearing, as well as information about the appeals process.

### University Board of Student Conduct

The Vice President of Student Life & Dean of Students designates a University Board of Student Conduct (UBSC) whenever charges may result in suspension or expulsion, including all cases involving academic misconduct. In these cases, the Associate Dean of Students chairs the UBSC, comprised of a minimum of three members of the Kettering community and including representatives from faculty, staff, and students. The Associate Dean of Students investigates the charges and prepares the case for presentation to the UBSC. All presentations include resolution options. The UBSC makes recommendations to the Vice President of Student Life & Dean of Students, who may endorse, alter, or dismiss them.

### Other Resolution Options

The Vice President of Student Life & Dean of Students 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 judicial board 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 a designated hearing officer upholds 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 Associate Dean of Students 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 Vice President of Student Life & Dean of Students 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 misconduct 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's. Interim suspension may also be imposed when the accused student's continued presence appears to disrupt the University's regular or special functions, or threatens 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 Vice President of Student Life & Dean of Students 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 Conduct may recommend suspension, but only the Vice President of Student Life & Dean of Students may impose it.

- **Expulsion**

Expulsion—a permanent involuntary separation of a student from Kettering University—may be recommended by a University Board



of Conduct, but only the Vice President of Student Life & Dean of Students may impose it.

- **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.

- **Appeals**

Any student who has been sanctioned through Kettering University Student Misconduct processes has the right to appeal to the Vice President of Student Life & Dean of Students. 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 of Student Life & Dean of Students choose to grant an appeal, the case will be reviewed and a written decision will be conveyed to the student indicating whether the sanction[s] shall stand, be modified, or reversed.

## Students' Use of Technology

The use of any personal computational or communications devices in the classroom, not otherwise governed by 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, text pagers, and cell phones. Any use of such devices without the instructor's approval is prohibited. The use of such devices without 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 misconduct policies and procedures.

Students are expected to familiarize themselves with Kettering University's Acceptable Use Policy (<https://my.kettering.edu/page/acceptable-use-policy>), posted on the "Policies and Standards" section of the Information Technology website.

## 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 Vice President of Student Life & Dean of Students (VPSL) and/or her designate, who will meet with the faculty member to discuss the alleged incident. The VPSL will also meet with the student to determine possible judicial action after determining whether or not the student's behavior violated the Kettering Code of Student Conduct. The VPSL will either appoint a judicial officer to adjudicate the matter or refer it for action by a University Board of Student Conduct. If the dismissal occurs by Friday of seventh week, student will receive a grade of W (withdrawal). If the dismissal occurs after Friday of seventh week, student will receive a non-passing grade.

## 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 forms, 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 Vice President of Student Life & Dean of Students, the Director of Human Resources, other University officials, or via our Non-Academic Grievance Form, available in the Student Life Office, Academic Services, the Wellness Center, Thompson Hall, and online at the Student Life website [add URL].

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. We will maintain confidentiality 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 Vice President of Student Life & Dean of Students, the Director of Human Resources, other University officials, or via our Non-Academic Grievance Form, available in the Student Life Office, Academic Services, the Wellness Center, and Thompson Hall.

## Student Complaint Procedures

A complaint is a written or verbal expression of dissatisfaction or formal allegation against the university, its units, its employees (including faculty and staff), and/or its students.

### Harassment and Discrimination

For complaints related to harassment or discrimination in the learning or work environment, refer to the Student Life section of this catalog, under Student Conduct: Behavioral Standards.

### 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 Dean of Students (for non-academic-related issues) or the Associate Provost for Assessment and Academic Support (for academic-related issues).

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

## Electronic Communications

All students have the privilege of having a Kettering University Google Apps e-mail account. The Kettering e-mail account is one of the official ways Kettering University faculty and staff communicate to 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, forwarding Kettering emails to another e-mail service provider is strongly discouraged, because that provider may have less storage capacity, fewer features, and may prevent students from replying directly to the original e-mail source.

Due to the proliferation of spam and phishing emails, students may receive e-mails that request personal information, such as usernames and passwords. Although it may look authentic, pretending to originate from a legitimate source such as Kettering, students are to delete such emails immediately without opening them, recognizing that a legitimate source, such as the Kettering IT department, would never ask students for their passwords. Students are asked to be cautious regarding any unsolicited e-mails as they may contain elements that could prove to be detrimental to personal computers.

Questions: Contact Information Technology

## Academic Terms

The Kettering University on-campus schedule operates on four 11-week terms per year.

## Thesis

### Thesis Option – MS in Engineering

A thesis option is available for designated graduate programs. The thesis is required for on-campus research programs in Electrical Engineering and Computer Engineering.

### Masters Thesis

Students must be participants in classes on campus during at least two of the terms in which they are working on the thesis. The degree department will specify which course(s) may be replaced by the thesis. Criteria for topic selection are up to the degree department, as are thesis-option prerequisites, if appropriate. Information about the administrative requirements for a Masters Thesis may be obtained from the Graduate School.

A thesis committee of at least three (3) faculty members is required. Students must obtain the written consent of the individuals who will serve on the committee, starting with the professor who will be the major advisor and chair of the committee. If a student is unable to find a professor to be the major advisor, then the student will not be able to elect the thesis option. Students are urged to form the advisory committee and gain approval of a written research proposal during their first year of graduate student and should begin work on the thesis project as soon as the proposal is approved. Registration for thesis credits requires the approval of the chair of the thesis committee. This approval is contingent upon prior approval of the research proposal by the thesis committee.

Master's theses are theory-based and goal-oriented. The criteria for success are achievement of the research goal and production of a written thesis of publishable quality.

Questions: Contact the program advisor

## Transfer Credit

The maximum number of graduate credits for which a person may receive transfer credit is eight (8) credit hours. Credit is only considered for courses with a grade of B or better. All requests for transfer credit should be for graduate-level courses (taken for graduate credit) significantly similar to a specific course within the student's program.

To apply for transfer credit, the student must complete the Application for Transfer Credit Form (<https://drive.google.com/file/d/0B8hhSHxvaasqSHZrTnNTcjVkJU0k/view>) and submit an official transcript from an accredited institution, plus a course description and syllabus. There is a processing fee of \$5.00 (U.S.) per credit hour for transfer credit (i.e., the processing fee to transfer in for a 4-credit course is \$20.00).

**Note:** Programs through the Department of Business have additional transfer credit guidelines. Refer to the individual program sections of this catalog for more information.

Questions: Contact the Graduate School at [gsr@kettering.edu](mailto:gsr@kettering.edu) ([gradoff@kettering.edu](mailto:gradoff@kettering.edu)) for more information.

## Withdrawals

### Course Withdrawals

When circumstances occur whereby a student feels that completion of a course is not possible or in the student's best interest, the student may request a non-punitive grade of W (Withdrawn) be issued by the Registrar's Office. Such requests will be accepted and honored during the course withdrawal period specified on the published academic calendar. After the course withdrawal period, the student may not withdraw from the course and is committed to receiving a Kettering University letter grade. A student who wishes to withdraw from a course must submit a written request using the Graduate Program Course Withdrawal Form (<https://drive.google.com/file/d/0B8hhSHxvaasqNENuY2pkVDBXYmM/view>). Refunds or reduction of tuition are made according to the published schedule in the graduate catalog.

### University Withdrawal

Withdrawing from the University requires a written request to the Office of the Registrar at [registrar@kettering.edu](mailto:registrar@kettering.edu).

### Withdrawal due to Active Duty

Students may withdraw from the University and receive a 100% tuition refund upon presenting to the Registrar, the original Armed Forces orders. Non-punitive grades of W will be issued. Should the call come during eighth week or later, in the judgment of the instructor and the student, a grade of Incomplete (I) may be given with no reimbursement of tuition. Course work then would be completed per arrangements agreed upon by the instructor and student.

Questions: Contact the Office of the Registrar

### On-Campus Plan of Study for International students

International students will be able to utilize a summer term for internships, better aligning the graduate program with the University's mission. The on-campus programs operate on a calendar similar to a conventional quarter system: Fall, Winter, and Spring terms are "regular"

academic terms during which students normally enroll full-time, and the Summer term is optional.

Many variations of this plan are possible, both with or without thesis. In particular, students may begin the program in any term, not just Fall. However, international students are required to complete two academic terms to be eligible for a non-study/internship term. This works perfectly for students that start in Fall or Winter. If an international student starts in Spring term, they will not be able to take an internship their first summer. They may forego the non-study/internship term or apply to have their non-study/internship term changed to a regular academic term. For an international student, only one non-study/internship term is allowed during the plan of study.

The non-study/internship term offers the opportunity for the student to work in an internship at a related industry, work on-campus, travel, or optionally register in further coursework.

Please refer to specific program information as you develop your plan of study. Note that the CE and EE concentrations, in the MS Engineering program, require a masters thesis which is non-credit bearing. However, in the other MS Engineering concentrations the masters thesis is optional and carries eight (8) credit hours.

Note that eight (8) credit hours constitutes full time for financial aid, and visa requirements, however, students may elect to carry a higher course load. While some students prefer to take one class at a time, this may create issues with financial aid or visa status.

Students enrolling in the on-campus MBA, MS in Engineering Management, or MS in Operations Management, may have prerequisite courses that will lengthen the plan of study.

#### Example Plan of Study without Thesis:

Classification	Code	Earned Hours
First Year	Fall	8 credits coursework
	Winter	8 credits coursework
	Spring	8 credits coursework
	Summer	Non-Study / Internship term
Second Year	Fall	8 credits coursework
	Winter	8 credits coursework

#### Example Plan of Study with Thesis:

Classification	Code	Earned Hours
First Year	Fall	8 credits coursework
	Winter	8 credits coursework
	Spring	8 credits coursework
	Summer	Non-Study / Internship term
Second Year	Fall	8 credits coursework
	Winter	8 credits coursework + thesis 1
	Spring	Thesis defense and submission

#### Example Plan of Study without Thesis, taking summer classes.



Classification	Code	Earned Hours
First Year	Fall	8 credits coursework
	Winter	8 credits coursework
	Spring	8 credits coursework
Second Year	Summer	8 credits coursework
	Fall	8 credits coursework

## Leave of Absence

The Graduate 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

## 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 addresses or phone numbers should be made by the student through Banner Self Service (<https://generalssb.kettering.edu/BannerGeneralSsb/ssb/personalInformation/#/personalInformationMain>). Changes in addresses and phone numbers can also be made in the Registrar's Office, Room 3-309 AB.

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 are 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 your transcript and is maintained by the Registrar's Office at Kettering University and is normally reflected through a transcript. All requests for transcripts (<https://drive.google.com/open?id=0B8hhSHxvaasqU25BYWEzWxp6NHM>) must be in writing and should include the student's full name (or name used while attending Kettering), Student Identification Number (or last four digits of Social Security number), current daytime telephone number and signature to ensure proper identification of the records requested.

The Registrar's Office will accept this written permission in person, by fax 810-762-9836, scan/email, or by US mail. There is no charge for transcripts. Official transcripts will not be issued to students who fail to meet their financial obligations or agreements with Kettering University. Unofficial transcripts are also available on Banner Self Service ([https://ssb.kettering.edu/CKU1/ku\\_web\\_trans.select\\_transcript](https://ssb.kettering.edu/CKU1/ku_web_trans.select_transcript)).

## Family Educational Rights and Privacy Act (FERPA)

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 (<https://my.kettering.edu/page/ferpa-family-educational-rights-and-privacy-act>).

# 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 (<https://my.kettering.edu/page/acceptable-use-policy>), the Information Resources Policies, Etiquette & Rules (<https://my.kettering.edu/page/information-technology-resources-etiquette-rules-policies>) and any other IT policies (<https://my.kettering.edu/page/policies-and-standards>) as documented. Some of the major technical services provided to students are:

## Help Desk

The Help Desk provides technical support for our computing resources (<https://my.kettering.edu/page/help-desk>) and is located in the Academic Building (AB), Room 2-340. Staff are available Monday through Friday 8:00 a.m. – 7:00 p.m. Contact us by phone at (810) 237-TECH (extension 8324) or by coming in person to 2-340 AB. You may also send e-mail to [helpdesk@kettering.edu](mailto:helpdesk@kettering.edu) at any time. 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 (<https://my.kettering.edu/page/google-apps-education>).

The Kettering e-mail account is the official way Kettering University faculty and staff communicate to 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. Our policy is to communicate by Kettering email, to ensure FERPA (<https://my.kettering.edu/page/ferpa-family-educational-rights-and-privacy-act>) compliance. Therefore, please do not auto forward to another e-mail service provider which may have less storage capacity, fewer features, and may hinder you to reply directly to the original email source.

Due to the proliferation of spam and phishing emails, be advised that you may receive emails that request 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 you to provide information such as passwords. Be cautious regarding any unsolicited email as it may contain elements that would prove to be detrimental to your computer.

## Virus Protection

We strongly recommend 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 (<https://my.kettering.edu/page/wireless-profiles>).

## 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 (<https://my.kettering.edu/tools-applications/banner-student-self-service>) 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

Many professors utilize the Blackboard Learning Management System (<https://my.kettering.edu/tools-applications/blackboard>) 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.

## Computer Labs

The main computer labs are located in the computer wing on the 3rd floor of the Academic Building. There are computers running Windows and Linux available for student use. Students have 12GB storage on the network (<https://my.kettering.edu/page/network-academic-storage-students-0>). Most of these are available 24 hours a day, 7 days a week unless otherwise posted. There are also various departmental labs that are regulated by the host academic department.

## Virtualization

The Virtual Computer Lab (KUcloud (<https://my.kettering.edu/tools-applications/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 the various systems, including the Internet, is available through the Help Desk and on the IT web site (<https://my.kettering.edu/page/instructional-administrative-and-information-technology>). The IT web pages contain valuable information to help maximize your use of the Kettering University computing resources.

## Help Desk Support

Have a question? We've got answers!

- **In person** assistance by visiting the technology Help Desk Monday-Friday, 8:00 a.m.- 7:00 p.m.
- We are located on the 2nd floor of the Academic Building in room 336.
- **Phone** support by calling (810) 237-TECH (extension 8324).
- Submit a **Help Desk call ticket** by sending an email to [helpdesk@kettering.edu](mailto:helpdesk@kettering.edu).

# LIBRARY SERVICES

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## Kettering University Library

The Library subscribes to various multi-disciplinary databases that contain academic journals, newspaper and magazine articles, technical papers, conference proceedings and standards. Access is available 24/7 for all students, both on campus and off, through the library website (<https://my.kettering.edu/academics/academic-resources/library>).

Special attention has been given to include books and the publications of American Society of Mechanical Engineers (ASME), Institute of Electrical and Electronics Engineers (IEEE), Society of Automotive Engineers (SAE), Society of Manufacturing Engineers (SME), American Chemical Society (ACS), Association of Computing Machinery (ACM), and proceedings for many curriculum-related societies. For on-campus students, materials not owned by the Kettering University Library can usually be obtained through Interlibrary Loan (<https://my.kettering.edu/page/interlibrary-loan-faq>). Many unique items can also be borrowed, including graphing calculators, iPads, laptops, a GoPro camera and course textbooks.

Some helpful library telephone numbers include:

Phone Number	Contact
810-762-7814	Circulation Desk
810-762-9841	Interlibrary Loan
810-762-9598	Reference Desk
800-955-4464, ext. 7814	Kettering University Toll-free Number

## Kettering University Archives

The University Archives is located in the newly renovated Durant-Dort Factory One Established 1886 building, located at 303 W. Water Street near downtown Flint (a twenty minute walk along the Flint River Trail from campus). The archives document America's industrial and business heritage with particular interest in the American automobile industry, the city of Flint, and the history of Kettering University. The Charles Kettering Collection is one of the largest collections in the archives and has been used by scholars worldwide. The archives' digital photo collection now exceeds 100,000 images. A partial online catalog along with digitized photos can be found on the archives website (<http://kettering.pastperfectonline.com>). Kettering University's Archivist may be reached at (810) 820-7747. The Archives is open to the public from 10:00 a.m. to 4:00 p.m., Monday through Friday, excluding holidays.

# ALUMNI ENGAGEMENT

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The Office of Alumni Engagement (<https://www.kettering.edu/alumni>) connects and engages Kettering University alumni through gatherings and events with the end result being a dynamic relationship between the University and Alumni who will be more engaged and involved in volunteering, mentoring, recruiting, and giving back to the University.

By partnering with the Kettering/GMI Alumni Association Board, Admissions, Marketing, Co-op, Annual Giving, and all University Advancement, the Office of Alumni Engagement will incrementally increase each year the number of alumni engaged and giving back to the University through well-timed and meaningful programs and activities.

Each year, programming includes class reunions, Homecoming Weekend, regional alumni receptions throughout the country, company alumni "Bulldog Breakfasts," alumni recognition ceremonies, and affinity programs directed to specific alumni. Other types of programming include the Alumni Ambassador program and working to establish Alumni Regional Networks in geo-targeted areas.

The Kettering/GMI Alumni Association Board is made up of alumni who want to give back to the University with their time, talent, and resources. The Board is comprised of five committees:

1. Student Recruitment/Alumni Involvement
2. Alumni Events
3. Alumni Awards
4. Alumni Service and Benefits
5. Directorship

The Kettering/GMI Alumni Association annually recognizes outstanding and notable alumni for their professional accomplishments with the following awards:

1. Alumni Service Award
2. Young Alumni Award
3. Engineering Achievement Award
4. Entrepreneurial Achievement Award
5. Management Achievement Award
6. Civic Achievement Award
7. Outstanding Achievement Award
8. Human Relations Award
9. Distinguished Alumnus/Alumna Award

The Alumni Engagement staff and Alumni Board jointly support the Student Alumni Council (SAC) on campus. SAC is a 15-student organization fostering interaction between alumni and students through various activities such as the Visiting Alumnus/Alumna Speaker Program, fundraising, Homecoming Weekend, and special workshops. SAC typically brings four alumni speakers on campus each term representing a diversity of industries, careers, and subjects students are interested in.



# ADMINISTRATION AND FACULTY

**Dr. Robert K. McMahan, Jr.**, President

**Dr. James Z. Zhang**, Senior Vice President for Academic Affairs and Provost

**Mr. Thomas W. Ayers**, Vice President for Administration and Finance

**Mr. Cornelius (Kip) Darcy**, Vice President for Marketing, Communications and Enrollment

**Ms. Susan L. Davies**, Vice President for University Advancement and External Relations

**Ms. J. Betsy Homsher**, Vice President for Student Life and Dean of Students

**Ms. Viola M. Sprague**, Vice President for Instructional, Administrative and Information Technology

**Dr. Christine M. Wallace**, Vice President for Kettering Global

**Mr. Donald G. Rockwell**, University Counsel

## Deans

**Dr. Craig J. Hoff**, Dean, College of Engineering, Professor of Mechanical Engineering

**Dr. Scott W. Reeve**, Dean, Graduate School and Sponsored Research, Professor of Chemistry

**Dr. Michael E. Smith**, Dean, School of Management, Professor of Supply Chain Management and F. James McDonald Chair of Supply Chain Management

**Dr. Laura Vosejka**, Dean, College of Sciences and Liberal Arts, Professor of Practice Dept. of Chemistry

## Academic Department Heads

**Dr. Leszek Gawarecki**, Department of Mathematics

**Dr. John Geske**, Department of Computer Science

**Dr. Scott Grasman**, Department Head, Industrial & Manufacturing Engineering

**Dr. Daniel Ludwigsen**, Department of Physics, including Engineering Physics

**Dr. Bassem Ramadan**, Department of Mechanical Engineering

**Dr. Mark Thompson**, Department of Electrical & Computer Engineering

**Dr. Stacy Seeley**, Department of Chemistry & Biochemistry, including Chemical Engineering and Applied Biology

## Faculty

The Kettering University faculty listed below have been designated to teach the graduate courses for our programs. The majority hold doctorates and nearly all of them have consulting experience in industry and business.

**Patrick J. Atkinson**, Professor of Mechanical Engineering, B.S. 1991, Kettering University; M.S. 1994, Ph.D. 1998, Michigan State University

**Javad Baqersad**, Assistant Professor of Mechanical Engineering B.S. 2005, Yazd University, Iran; M.S. 2008, Iran University of Science and Technology; M.S.E. 2014, University of Massachusetts; Ph.D. 2015, University of Massachusetts

**Jennifer Bastiaan**, Assistant Professor of Mechanical Engineering B.S. 1997, GMI Engineering & Management Institute; Ph.D. 2015, University of Waterloo, Ontario

**Randall Beikmann**, Professor of Practice, Mechanical Engineering B.S. 1982, Kansas State University; M.S. 1983, University of Michigan; Ph.D. 1992, University of Michigan

**K. Joel Berry**, Professor of Mechanical Engineering, B.S.M.E. 1979, General Motors Institute; M.S. 1981, Michigan State University; Ph.D. 1986, Carnegie Melon University; P.E., Michigan

**Srinivas R. Chakravarthy**, Professor of Industrial Engineering, B.Sc. 1973, M.Sc. 1975, University of Madras, India; Ph.D. 1983, University of Delaware

**Susanta K. Das**, Associate Professor of Mechanical Engineering B.S. 1991, University of Dhaka; M.S. 1993, University of Dhaka, Bangladesh; Ph.D. 1999, Tokyo Institute of Technology, Japan.

**Gregory W. Davis**, Professor of Mechanical Engineering, B.S. 1982, University of Michigan; M.S. 1986, Oakland University; Ph.D. 1991, University of Michigan

**Arthur P. Demonte**, Lecturer of Business Administration B.S. 1982, Pace University; M.B.A. 1988, Columbia University

**Boyan N. Dimitrov**, Professor of Applied Mathematics M.A. 1966, Sofia University, Bulgaria; Ph.D. 1971, Moscow State University, USSR; Dr. Sc. 1986, Sofia University

**Yaomin Dong**, Professor of Mechanical Engineering B.S. 1983, M.S. 1986, Northeast University; M.S. 1995, Ph.D. 1998, University of Kentucky

**Raghu Echempati**, Professor of Mechanical Engineering, B.S.M.E. 1970, Andhra University, Waltair, India; M.Tech. 1972 & Ph.D. 1976 Indian Institute of Technology, P.E., Mississippi

**John G. Geske**, Department Head & Associate Professor of Computer Science, B.S. 1974, M.S. 1979, Ph.D. 1987, Iowa State University

**Scott E. Grasman**, Department Head, Professor of Industrial Engineering B.S.E. 1994, M.S.E. 1995, Ph.D. 2000, University of Michigan. 1969

**Satendra Guru**, Lecturer of Industrial Engineering B.S.M.E. 2005, Kettering University; M.S. 2013, Kettering University

**Huseyin R. Hizirolu**, Professor of Electrical Engineering, B.S. 1975, Gazi University, Ankara, Turkey; M.S. 1979, Middle East Technical University, Turkey; Ph.D. 1982, Wayne State University

**Craig J. Hoff**, Dean, College of Engineering, Mechanical Engineering, Professor of Mechanical Engineering, B.S. 1979, Michigan State University; M.S. 1981, Michigan State University; Ph.D. 1992, University of Michigan, P.E., Michigan

**Petros Ioannatos**, Associate Professor of Economics, B.A. 1979, The Athens Graduate School of Economics and Business Science, Greece; M.A. 1982, University of Windsor, Canada; Ph.D. 1989, Wayne State University

**Beverly Jones**, Associate Professor of Management, A.S. 1987, B.Sc. 1987, Northwood Institute; M.S. 1990, Central Michigan; Ph.D. 1994, Union Institute

**Kenneth L. Kaiser**, Professor of Electrical Engineering, B.S. 1983, M.S. 1984, Ph.D. 1989, Purdue University, P.E. Michigan



**Jaerock Kwon**, Associate Professor of Computer Engineering B.S., 1992, Hanyang University, Seoul, Korea; M.S., 1994, Hanyang University, Seoul, Korea; Ph.D. 2009, Texas A&M University

**Brenda S. Lemke**, Lecturer of Mechanical Engineering B.S.M.E. 1977, Michigan State University; M.S.M.E. 1996, GMI Engineering & Management Institute

**Arnaldo Mazzei**, Professor of Mechanical Engineering B.S.M.E. 1987, M.S.M.E. 1991, University of Sao Paulo; Ph.D. 1998, University of Michigan

**Robert K. McMahan**, Professor of Physics and President, B.S., A.B. 1982, Duke University; Ph.D. 1986, Dartmouth College

**Lawrence Navarre**, Lecturer of Business Administration B.B.A. 1984, Kent State University; M.S.M. 1990, Purdue University

**Homayun K. Navaz**, Professor of Mechanical Engineering, B.S. Chemical Engineering 1980, Mississippi State University; M.S. University of Michigan; Ph.D. 1985, Rice University

**Jungme Park**, Assistant Professor of Computer Engineering B.S. 1989, Korea University; M.S. 1996, University of Alabama; Ph.D. 2001, University of Alabama

**Diane L. Peters**, Assistant Professor of Mechanical Engineering B.S.M.E. 1993, University of Notre Dame; M.S. 2000, University of Illinois at Chicago; Ph.D. 2010, University of Michigan

**Juan R. Pimentel**, Professor of Computer Engineering, B.S.E.E. 1975, Universidad de Ingenieria, Peru; M.S. 1978, Ph.D. 1980, University of Virginia

**Ahmad Pourmovahed**, Professor of Mechanical Engineering, B.S. 1977, Arya-Mehr University of Technology, Iran; M.S.M.E. 1979, Ph.D., 1985, University of Wisconsin-Madison

**Bassem Ramadan**, Department Head, Mechanical Engineering, Professor of Mechanical Engineering B.E. 1984, Beirut; M.S. 1986, Ph.D. 1992, Michigan State University

**Scott W. Reeve**, Dean, Graduate School and Sponsored Research, Professor of Chemistry, B.A. 1987, Augsburg College, Ph.D. 1992, University of Minnesota

**Matthew S. Sanders**, Professor of Industrial Engineering B.S. 1980, M.S. 1981 Indiana State University 1980; Ph.D. Texas Tech University 1987

**Dr. Michael E. Smith**, Dean, School of Management, Professor of Management, B.S. 1978, Oregon State University; B.S., B.S. 1980, Oregon State University; M.A. 1982, Hollins University; M.A. 1984, State University of New York at Stony Brook; Ph.D. 2000, Portland State University, F. James McDonald Chair of Supply Chain Management

**Peter L. Stanchev**, Professor of Computer Science M.S. 1972, Ph.D. 1975, D.Sc. Sofia University

**Laura L. Sullivan**, Professor of Mechanical Engineering B.S. 1984, Arizona State; M.S.E. 1988, Ph.D. 1992, M.S.E. University of Texas at Arlington

**Nozar Tabrizi**, Associate Professor of Computer Engineering B.S.E.E. 1980, M.S.E.C.E. 1988, Sharif University of Technology, Iran; Ph.D. 1997, University of Adelaide, Australia

**Massoud S. Tavakoli**, Professor of Mechanical Engineering B.S.M.E. 1981, Louisiana State University; M.S.M.E. 1983, Ph.D. 1987, Ohio State University; P.E., Georgia

**Allan Taylor**, Lecturer of Electrical Engineering B.S.E.E. 2009, M.S.Eng. 2011, Kettering University

**Girma S. Tewolde**, Associate Professor of Computer Engineering B.Sc. 1992, Addis Ababa University, Addis Ababa, Ethiopia; M.Eng. Sci. 1995, University of New South Wales, Sydney, Australia; Ph.D. 2008, Oakland University

**Mark G. Thompson**, Department Head, Electrical and Computer Engineering, Professor of Electrical Engineering, B.S. 1976, M.S. 1977, Ph.D. 1980, Michigan State University

**Mohammad Torfeh**, Professor of Electrical Engineering B.S. 1977, University of Isfahan; M.S. 1979, Ph.D. 1982, Wayne State University

**Laura Vosejпка**, Dean, College of Sciences and Liberal Arts, Professor of Practice Dept. of Chemistry, B.A. Ohio State University, Ph.D. University of Wisconsin-Madison

**Ravi K. Warriar**, Professor of Electrical Engineering B.Sc. 1972, University of Calicut, India; M.S. 1980, Ph.D. 1985, University of New Mexico

**Kenneth Williams**, Assistant Professor of Business Administration B.B.A. 1981, University of Michigan; M.B.A. 1986, Wayne State University

**Mehrdad H. Zadeh**, Associate Professor of Computer Engineering B.Sc.C.E. 1992, Shiraz University, Fars, Iran; M.A.Sc.E.E. 2004, Concordia University, Montreal, Canada; Ph.D. 2009, University of Waterloo, Ontario, Canada

**Paul Zang**, Professor of Mechanical Engineering B.S.M.E. 1978, Lawrence Institute of Technology; M.S.M.E. 1980, University of Michigan; Ph.D. 1987, Michigan State University; P.E., Michigan

**James Z. Zhang**, Professor of Electrical Engineering, Senior Vice President for Academic Affairs and Provost, B.S.E.E. 1986, Hunan University, PRC; M.A. 1993, Indiana University; M.S.E. 1993, Purdue University; Ph.D. 2002, Purdue University

**Xuan (Joe) Zhou**, Assistant Professor of Electrical Engineering B.S. 2002, Taiyuan University of Technology, China; M.S. 2005, Xi'an Jiaotong University, China; Ph.D. 2012, University of Michigan-Dearborn

# CONTACT INFORMATION

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The information below provides contact information that you may need during your studies in the Kettering University graduate program. We invite you to contact the respective person(s) as required to address your questions or concerns.

Main Graduate Contact Information	(866) KU-GRADS / gsr@kettering.edu
Admission/Application Status	Dyan Robinson: (810) 762-9788 / admissions@kettering.edu
Blackboard/Banner Web Questions	Helpdesk: (810) 237-8324 / helpdesk@kettering.edu
Course Withdrawal	Registrar's Office: (810) 762-7476/ registrar@kettering.edu
School of Management- Graduate Course Advising	business@kettering.edu
Enrollment Verification	Registrar's Office: (810) 762-7476 / registrar@kettering.edu
Financial Aid Office	(810) 762-7859 / finaid@kettering.edu
Financial Standing/Tuition payments/Receipts/Tax Info	Student Accounts Office: (810) 762-9552/ studentaccounts@kettering.edu
Grades	Registrar's Office: (810) 762-7476 / registrar@kettering.edu
Graduate Assistantship	gsr@kettering.edu
Graduation Information	Registrar's Office: (810) 762-7476 / registrar@kettering.edu
Incomplete Grades/Status	The course professor / see course syllabus
Kettering University Online	Janell Beil: (810) 762-9523 / KUOnline@kettering.edu
Registration Information	Registrar's Office: (810) 762-7476 / registrar@kettering.edu
Student Change of Name, Address, Info	Registrar's Office: (810) 762-7476 / registrar@kettering.edu
Technical Support	Helpdesk: (810) 237-8324 / helpdesk@kettering.edu
Testing out of pre-requisite course	Contact course department
Transcript Request	Registrar's Office: (810) 762-7476 / registrar@kettering.edu
Transfer Credits	gsr@kettering.edu
VA Benefits	Michelle Smith: (810) 762-9912 / msmith@kettering.edu

## COURSES A-Z

### Accounting (ACCT)

#### ACCT-518 Accounting/Financial Concepts 4 Credits

Prerequisites: None

Students will gain an understanding of how accounting data is developed and used by managers in making decisions. The course is divided into three sections. First, the Financial Accounting section discusses how basic financial events are recorded and presented in the accounting statements. Second, the Cost Accounting section discusses the nature and recording of manufacturing costs, development of overhead rates, job and process costing, budgeting, and control of manufacturing cost. Third, the Managerial Accounting section discusses profit volume analysis, relevant cost analysis, time value of money concepts, and capital budgeting.

Lecture: 3, Lab 0, Other 1

#### ACCT-639 Managerial Accounting 4 Credits

Prerequisites: ACCT-518

The use of managerial accounting information for planning and control will be studied. Case studies emphasize the role of accounting information in the decision making process. Designing, implementing, and the use of planning and control systems to achieve the firm's strategies are emphasized. Ethics issues are also addressed throughout the course.

Lecture: 3, Lab 0, Other 1

#### ACCT-691 Special Topics in Mgr Accting 4 Credits

Prerequisites: None

Lecture: 4, Lab 0, Other 0

### Business (BUSN)

#### BUSN-659 International Business 4 Credits

Prerequisites: None

An overview of the expanding role of international business in the world marketplace is provided. Emphasis is placed on exploring the complex issues relating to the best practices in International Business. This course will use case studies to illustrate the major topics.

Lecture: 4, Lab 0, Other 0

#### BUSN-689 Organizational Behavior 4 Credits

Prerequisites: MGMT-639

A comprehensive examination of different organizational behavior theories will be conducted including the analysis at individual, group and organizational levels. Individual levels include perception, personality, and motivation. Group levels will include decision making, group dynamics and team building. Organizational levels will include communications, empowerment, leadership, diversity and cross-cultural issues. Experiential activities will include class exercises such as case studies, videos, and survey instruments as well as team and individual assignments.

Lecture: 4, Lab 0, Other 0

#### BUSN-779 MBA Capstone: Innovation & New Ventures 4 Credits

Prerequisites: MGMT-659

This capstone focuses on the creation or startup of a new organization based on an innovation in product, process or delivery. Particular emphasis is placed on creating a new products or services in response to a human need, testing at several stages of the new product development process, gaining initial customers, gaining distribution, obtaining financial support and managing the new organization. This is a "hands on" course where students will actually develop some new product idea and/or prototype, conduct various types of market research and write initial business plans. The course is flexible to support students interested in a variety of fields.

Lecture: 4, Lab 0, Other 0

### Computer Engineering (CE)

#### CE-612 Digital Systems Design 4 Credits

Prerequisites: None

The principles and practices used in the design of modern complex combinational and sequential digital systems are covered in this course. Digital logic design, analysis, simulation, and implementation techniques are covered. Fundamental algorithms underlying computer-aided design (CAD) tools are studied. Schematic diagrams, hardware description languages (HDL), and system-on-programmable chip (SoPC) design tools are used to specify designs targeted for implementation in technologies ranging from discrete ICs to programmable logic devices, ASICs and SoPCs. Topics in testing of logic circuits and hardware-software co-design will be covered. The course is accompanied by laboratory component that allows students to exercise the principles and practices learned.

Lecture: 3, Lab 2, Other 0

#### CE-620 Microcomputer Systems 4 Credits

Prerequisites: None

The architectural features, design principles, development tools and techniques of advanced embedded microcomputers are covered in this advanced level course. 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. Students will also complete independent projects or research assigned by the instructor on topics such as low-power micro architectures and power-aware computing.

Lecture: 3, Lab 2, Other 0

#### CE-622 Computer Architecture and Organization 4 Credits

Prerequisites: None

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. An independent study or project will be completed.

Lecture: 3, Lab 2, Other 0

**CE-624 VLSI Design 4 Credits**

Prerequisites: None

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. An advanced project is completed.

Lecture: 3, Lab 2, Other 0

**CE-626 Real-Time Embedded Systems 4 Credits**

Prerequisites: None

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 research-oriented final project.

Lecture: 3, Lab 2, Other 0

**CE-642 Mobile Robotics 4 Credits**

Prerequisites: None

Fundamentals of robotics with an emphasis on mobile robots, which are intelligent integrated mechanical, electrical and computational systems functioning in the physical world will be covered. 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 explored. The course aims to provide both theoretical and practical experience to students through lectures and hands-on experience with real robots and simulation software. Students will also complete independent projects or research on current topics covering mobile robotics technologies and related fields.

Lecture: 3, Lab 2, Other 0

**CE-650 App Devel for Mobile Devices 4 Credits**

Prerequisites: None

Terms Offered: Winter of even years; Spring of odd years

This course discusses an overview of how to get started 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-672 Virtual Reality Systems: M&C 4 Credits**

Prerequisites: None

Terms Offered: Winter of even years; Spring of odd years

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. CE-672 students will be required to complete additional projects or independent review of research topics with approval of the instructor.

Lecture: 3, Lab 2, Other 0

**CE-680 Computer Networks 4 Credits**

Prerequisites: None

Organization, analysis, and design of interconnected systems of computers are studied. Topics include the Open System Interconnection model; the Internet reference architecture; network topology; media types; protocols; Ethernet; routing; TCP/IP; HTTP; wireless and mobile networks, multimedia Internet, industrial networks; and Internet applications. Students will be required to complete projects or independent review of research topics with approval of the instructor.

Lecture: 3, Lab 2, Other 0

**CE-684 Internet of Things (IoT) 4 Credits**

Prerequisites: None

The most important topics of the Internet of Things and its applications will be addressed. Topics include: Application domains, IoT protocols and architectures, distributed embedded systems, interoperability, data acquisition, control systems, instrumentation, access networks, the cloud, and IoT platforms. Appropriate IoT platforms and tools that support rapid prototyping, automated code generation, and testing is used in laboratory assignments. Students will be required to develop a complete IoT application for a term project or independent review of research topics with approval of the instructor.

Lecture: 3, Lab 2, Other 0

**CE-691 Computer Engineering Special Topics 4 Credits**

Prerequisites: None

Graduate level Special Topics in Computer Engineering.

Lecture: 4, Lab 2, Other 0

**CE-695 Graduate Research in Computer Engineering 8 Credits**

Prerequisites: None

This course is directed research towards a master's thesis. Students must take this course under the direction of a faculty advisor, and it is graded pass or fail. This course may be repeated for credit.

Lecture: 6, Lab 2, Other 0

**CE-699 Computer Engineering Independent Study 4 Credits**

Prerequisites: None

Terms Offered: As needed

Graduate level Independent Study in Computer Engineering

Lecture: 4, Lab 0, Other 0

## Computer Science (CS)

### CS-541 Web Technology 4 Credits

Prerequisites: CS-461

Terms Offered: Summer, Fall

The concepts, principles, issues and techniques for web technology are covered in this course. The main principles and protocols in internet, the key components in XHTML, JavaScript, PERL, CGI, Java Applets, XML will be taught. Students will also learn web database applications using MySQL and PHP.

Lecture: 4, Lab 0, Other 0

### CS-571 Software Requirements Engineering 4 Credits

Prerequisites: CS-471

Terms Offered: Summer, Fall

An in-depth investigation of the requirement and specification phase of the software engineering process is covered in this course. Topics include requirement determination, analysis and change techniques, requirement specification modeling with the aid of CASE tools, software quality assurance issues, walkthroughs and inspections. Case studies will also be presented and analyzed.

Lecture: 4, Lab 0, Other 0

### CS-699 Computer Science Graduate Level Independent Study Course 4 Credits

Prerequisites: None

Terms Offered: As needed

Graduate level Independent Study.

Lecture: 4, Lab 0, Other 0

## Elect. & Computer Engrg (ECE)

### ECE-610 Modeling of Dynamic Systems 4 Credits

Prerequisites: None

Modeling, simulation, and analysis of multivariable dynamic systems are covered in this course. Increasingly, practitioners are called upon to develop and to analyze realistic mathematic models of electromechanical or other dynamic systems. Approaches to modeling a variety of dynamic physical systems are discussed using examples of dynamic systems taken from a variety of fields. These systems are simulated using appropriate simulation tools. Most of the course is devoted to the analysis of linear systems using now classical techniques: linear algebra, state-space representations, and the state transition matrix. The material on nonlinear systems emphasizes modeling and simulation. Course work in linear algebra and difference and differential equations is a prerequisite for this course.

Lecture: 4, Lab 0, Other 0

### ECE-630 Advanced Digital Signal Processing 4 Credits

Prerequisites: EE-434 and MATH-408

Principles of optimum filtering, signal analysis, and spectral estimation are presented. Topics include: review of signal processing systems, the Discrete Fourier Transform, the Fast Fourier Transform, digital filter structures, optimum filters, multirate signal processing, adaptive signal processing, linear prediction, vibration analysis, wavelet theory, and signal processing applications.

Lecture: 4, Lab 0, Other 0

### ECE-642 Electric Machine Drives 4 Credits

Prerequisites: EE-342 and EE-424

Methods of controlling electric machines and their applications are discussed. Topics include solid-state devices; various switching schemes; types of drives; characteristics of motors; controlling motors including vector control; braking of motors; and dynamics of electric drives and applications.

Lecture: 4, Lab 0, Other 0

### ECE-648 Electromagnetic Compatibility 4 Credits

Prerequisites: None

In-depth classical and currents topics in the field of electromagnetic compatibility (EMC) are studied in this course. This includes signal integrity, high-speed digital design matching techniques, passive filter design, single and multilayer shielding, electrostatic discharge, high-frequency measurements, circuit board layout, and grounding methodology. Basic course work in electromagnetic compatibility is a prerequisite for this course.

Lecture: 4, Lab 0, Other 0

## Electrical Engineering (EE)

### EE-526 Advanced Power Electronics 4 Credits

Prerequisites: None

Terms Offered: Summer, Fall, Winter, Spring

Course work or work experience in power electronics or electric vehicle drive trains is a prerequisite for this course. An advanced class in power electronics providing state variable modeling of DC-DC converters.

Topics include: buck, boost/buck-boost/Cuk; state variable modeling of converter topologies: floating interleaved dual boost, floating double-interleaved dual boost, floating double boost double stage boost, and isolated full IH-bridge; converter control system design based on state variable models; circuits for soft switching in inverters and converters; single phase inverter design; three phase, six-step inverter design; multilevel inverter design; Pulse Width Modulation (PWM): SPWM, HEPWM, SVPWM; resonant converters: series, parallel, series-parallel; wireless battery charging.

Lecture: 4, Lab 0, Other 0

### EE-530 Digital Control Systems 4 Credits

Prerequisites: (EE-338 and EE-432)

Terms Offered: Winter, Spring

Control of continuous-time processes using computer-based controllers is studied. Topics include: design of control algorithms for implementation on digital computers; 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 of control systems using state-space methods. Implementation of real-time digital controllers is performed in the lab.

Lecture: 3, Lab 2, Other 0

### EE-582 Robot Dynamics and Control 4 Credits

Corequisites: EE-432

Prerequisites: None

Terms Offered: Summer, Fall

Principles of robot analysis, design, and operation are presented. Topics include: coordinate systems, kinematics and robot dynamics; feedback, feedforward, and adaptive methods for arm control; vision and intelligence; and mobile robots.

Lecture: 4, Lab 0, Other 0



**EE-621 Energy Storage Sys w/ EV App 4 Credits**

Prerequisites: (EE-210 and EE-310) or EE-212

The purpose of this course is to introduce the basics of energy storage systems. We will look at several competing energy storage concepts and management systems. The emphasis is 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, manufacturing, modeling and state estimation. Students are required to complete research projects and independent review of research topics with approval of the instructor.

Lecture: 4, Lab 0, Other 0

**EE-691 Graduate Special Topics in EE 4 Credits**

Prerequisites: None

Terms Offered: As needed

Graduate Level Special Topics in Electrical Engineering.

Lecture: 4, Lab 0, Other 0

**EE-695 Graduate Research in Electrical Engineering 8 Credits**

Prerequisites: None

Terms Offered: As needed

This course is directed research towards a master's thesis. Students take the course under the direction of a faculty advisor. This course may be repeated for credit.

Lecture: 8, Lab 0, Other 0

**EE-699 Graduate Level Independent Study in Electrical Engineering 8 Credits**

Prerequisites: None

Terms Offered: As needed

Graduate level Independent Study in Electrical Engineering.

Lecture: 8, Lab 0, Other 0

## Financial (FINC)

**FINC-619 Financial Management 4 Credits**

Prerequisites: ACCT-518

The performance of the financial management role in a firm is provided in this course. The first half of the course focuses on the theoretical valuation of stocks and bonds and the capital markets in which they are traded. The second half of the course focuses on both the use of financial leverage by the firm and working capital management. The need for financial managers to provide both ethical and legal leadership for the firm is stressed throughout the course.

Lecture: 4, Lab 0, Other 0

## Healthcare Management

**HMG-609 Healthcare Management 4 Credits**

Prerequisites: None

HMG-609 Healthcare Management 4 credit hours Prerequisite: Graduate Admission In this course students gain a broad understanding of the organization, financing and issues in health care delivery systems in the US. Students will apply core business skills and knowledge of health care unique functional areas in analyzing health care case studies. Students will critically evaluate health care issues and policies and their effect on health care system performance.

Lecture: 4, Lab 0, Other 0

## Indust/Manufctrng Engrg (IME)

**IME-564 Ethics and Practice of Engineering 4 Credits**

Prerequisites: None

Minimum Class Standing: Senior

Terms Offered: Summer, Fall

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, team, engineering/management responsibilities, environmental considerations and professional registration. This class requires live weekly discussion.

Lecture: 3, Lab 0, Other 1

**IME-573 Advanced Quality Assurance 4 Credits**

Prerequisites: IME-333 and IME-471

Minimum Class Standing: Senior

Terms Offered: Summer, Fall

The advanced topics of modern methods of quality control and improvement that are used in the manufacturing and service industries are covered in this course. It includes statistical methods of quality improvement, concept of variation and its reduction, statistical process control, designed experiments in quality improvement, and quality in the service sector. Taguchi and Deming's quality concepts will also be discussed.

Lecture: 3, Lab 0, Other 1

**IME-575 Failure Analysis 4 Credits**

Prerequisites: IME-301 or MECH-307

Minimum Class Standing: Senior

Terms Offered: Summer, Fall

An engineering materials analysis course emphasizing the interaction of materials and processing as they relate to product failure. Topic coverage includes fracture path analysis, fracture mode, brittle and ductile behavior, fracture mechanics, corrosion, and material process analysis. This course requires a laboratory analysis project.

Lecture: 2, Lab 2, Other 0

**IME-598 IME-Study Abroad 4 Credits**

Prerequisites: None

Advanced Topics in the Industrial Manufacturing Engineering. This is a transfer course taken a part of Kettering's Study Abroad Program.

Lecture: 4, Lab 0, Other 0

**IME-601 Fundamentals of Manufacturing Engineering 4 Credits**

Prerequisites: None

A general overview of the field of Manufacturing Engineering is provided in this course. Topics introduced include: various manufacturing processes, materials, quality assurance, quality control, safety, ISO/QS 9000, process and facilities planning, project management, and lean manufacturing. This course is delivered entirely via the internet.

Lecture: 3, Lab 0, Other 1

**IME-603 Numerical Control Machining 4 Credits**

Prerequisites: IME-301 or MECH-307

The fundamentals of computer numerical control (CNC) programming and computer-aided manufacturing (CAM) are introduced in this course. 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. Significant 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-652 Designing Value in the Supply Chain 4 Credits**

Prerequisites: None

Students gain an understanding of the decision-making tools necessary to design value in the global supply chain from concept to customer. Quantitative methods are employed to aid the decision-making process of demand forecasting and enterprise planning for the purpose of increased profit and value to stakeholders. Basic concepts in strategy, forecasting, demand planning, inventory control and value stream mapping will be taught and utilized to enable the decision-making process to be based on quantitative metrics.

Lecture: 3, Lab 0, Other 1

**IME-654 Enterprise Resource Planning 4 Credits**

Prerequisites: None

An understanding of the integrated approach to enterprise planning and its evolution from MRP I and MRP II is provided in this course. It describes the core structure of ERP systems and highlights the characteristics of emerging ERP based organizations. Various ERP tools and techniques are described and compared. The fundamental success factors in moving from traditional business functions to an integrated process-based ERP environment are introduced.

Lecture: 3, Lab 0, Other 1

**IME-656 Engineering for Healthcare Systems 4 Credits**

Prerequisites: None

This course examines the technical structure of the healthcare delivery system and the role that industrial and systems engineering (ISE) plays in its design and improvement. Included will be how healthcare systems work in hospitals, medical offices, clinics and other healthcare organizations. Traditional ISE methods for improving quality, patient safety, and employee productivity and satisfaction will be presented within a systematic application of value chain engineering designed to produce lean processes.

Lecture: 3, Lab 0, Other 1

**IME-660 Design for Manufacture and Assembly 4 Credits**

Prerequisites: IME-601

A study of the current methodologies associated with product design for manufacture and assembly. Topics include DFMA overview, Design for Function, Design for Assembly Principles, BDI-DFA Manual Methodology, Creative Concept Development, and Concept Selection Methodologies. Note: Students who have taken IME-474, Design for Manufacture or its equivalent are not eligible to enroll in this course but must substitute another engineering course approved by their faculty advisors.

Lecture: 3, Lab 0, Other 1

**IME-674 Quality Assurance and Reliability 4 Credits**

Prerequisites: (IME-605 or MATH-605)

The topics in quality assurance are covered in this course. Specifically, it includes introduction to quality and quality philosophy, statistical methods of quality improvement, concept of variation and its reduction, statistical process control, and acceptance sampling. Statistical software such as MINITAB is used throughout the course. Terms Offered: At least once on a live/tape basis and the rest via tape-delay basis. This is out of necessity and flexibility expected of the master's program.

Lecture: 3, Lab 0, Other 1

**IME-676 Lean Six Sigma 4 Credits**

Prerequisites: None

This techniques to maximize production efficiency and to 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.

Lecture: 3, Lab 0, Other 1

**IME-680 Computer Integrated Manufacturing 4 Credits**

Prerequisites: IME-601

CIM is defined with current terminology and recent concepts. It includes the relationships among the three major functions - design, manufacturing and business. CIM examples, obstacles to development and future trends are covered. Flexible manufacturing is highlighted. Key components of CIM are explored with special emphasis on robotic automation and control through interaction with the environment, CAD-CAM link with numerical control, computer supervisory control, process planning and quality assurance. Concurrent Engineering will be used in process and product quality selection. Lean manufacturing principles will be applied. Communication and networking, the artery of CIM, will be studied in the context of data compatibility and hierarchical control. Manufacturing analysis tools will be used to plan and implement a CIM system.

Lecture: 3, Lab 0, Other 1

## Information Systems (ISYS)

**ISYS-669 Enterprise Information System Models 4 Credits**

Prerequisites: None

An overview of information systems (IS) viewed at two levels: the strategic role of IS and a process-oriented view of the organization and its relationships with suppliers, customers, and competitors. We view processes as vehicles for achieving strategic objectives and transforming the organization. The major focus of the course is how organizations implement processes globally using enterprise resource planning (ERP), supply chain management (SCM), customer relationship management (CRM) Product Lifecycle Management (PLM) and social networks. The course also provides a brief IS infrastructure overview and addresses key IS management topics. Students learn about the ethical and legal implications of information systems.

Lecture: 4, Lab 0, Other 0

## Lean/Manufacturing Ops (MFGO)

### **MFGO-601 Globally Integrated Manufacturing Company 4 Credits**

Prerequisites: None

Integrated overview and introduction to contemporary global manufacturing operations. The focus of this course is the application of attitudes, skills, and knowledge required of managers, supervisors, and team leaders and manufacturing professionals in a cross-functional and cross-cultural manufacturing operation. After a brief historical overview of global, manufacturing, this course covers the following topics: global leadership, cross-cultural business communication, customers-across-continent, empowerment and cross-cultural teamwork, continuous process improvement, manufacturing metrics, policy deployment, ISO and QS 9000, computer integrated manufacturing, process re-engineering, international supply chain management, and theory of constraints. This foundation leads up to a discussion on the lean and agile manufacturing management. Students are required to use the concepts from the class to analyze their own work environment.

Lecture: 3, Lab 0, Other 1

### **MFGO-619 Six Sigma for Manufacturing 4 Credits**

Prerequisites: None

Techniques to maximize production efficiency and to maintain control over each step in the process will be examined in this course. The structured problem-solving methodology DMAIC (Define-Measure-Analyze-Improve-Control) will provide the framework for the course.

Lecture: 3, Lab 0, Other 1

### **MFGO-633 Lean Production Systems 4 Credits**

Prerequisites: None

Minimum Class Standing: NA

Terms offered: Fall, Spring

This course starts from the discussion of the evolution of the production systems, from craft to mass and to lean production. Principles of systems thinking and business dynamics applied to production systems are also studied. Contemporary lean thinking principles, lean enterprise development, and value stream mapping are studied and used in student projects. Modern enterprise improvement techniques such as Six Sigma, Theory of Constraints and Business Process Reengineering are also discussed.

Lecture: 3, Lab 0, Other 1

### **MFGO-635 Work Analysis for Lean Production Application 4 Credits**

Prerequisites: MFGO-633

A critical issue facing most manufacturers of a product is the design of a competitive and low-cost manufacturing operation. In this course, work analysis will consist of the application of process analysis, methods improvement, and work measurement and ergonomic techniques to meet the competitive goals of a manufacturing company or office environment. The intent of this course is to survey the basic techniques of methods design, work measurement, business process analysis, and ergonomics. The student will be expected to solve fundamental and open-ended problems encountered during the design, analysis, or operation of a manufacturing facility (or an office) that produces a discrete product (or service).

Lecture: 3, Lab 1, Other 0

### **MFGO-639 Quality Assurance and Reliability 4 Credits**

Prerequisites: None

Topics in quality assurance are covered in this course. Specifically, it includes introduction to quality and quality philosophy, statistical methods of quality improvement, concept of variation and its reduction, statistical process control, and acceptance sampling. Statistical software such as MINITAB is used throughout the course.

Lecture: 3, Lab 0, Other 1

### **MFGO-649 Metrics for Lean Production Improvement 4 Credits**

Prerequisites: MFGO-635 or MFGO-639

The manufacturing operations professional will be provided an understanding of the data typically available within a manufacturing environment and how to use this information for improving those operations within the lean paradigm. Basic financial accounting, activity based metrics, links to strategy, trend analysis and decision making will be covered. Student teams operate simulated companies in competition with other student teams to gain experience in applying the concepts taught.

Lecture: 3, Lab 0, Other 1

### **MFGO-659 Integrative Capstone Project 4 Credits**

Prerequisites: MFGO-649

The course will establish a business-focused, project-oriented perspective applicable to the integrated manufacturing operating (IMO) environment. Learning about the principles and techniques that are within the discipline of Project Management will involve a focus on the body of knowledge recognized by the Project Management Institute. The IMO environment will be the basis for projects by student teams as they integrate their knowledge gained from other courses and professional experience. The project requirement is expected to enable students to apply the Project Management concepts and techniques learned in the class. In summary, this course will assist the students to become knowledgeable about and practice Project Management, its applications, and limitations.

Lecture: 3, Lab 0, Other 1

## Management (MGMT)

### **MGMT-510 Foundations of Business 4 Credits**

Prerequisites: None

This course provides the prerequisite knowledge necessary for studying management in Kettering University's Online graduate program. Students are introduced to both a theoretical understanding, and practical application, of concepts in the disciplines of management, marketing, accounting and 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 program.

Lecture: 4, Lab 0, Other 0

### **MGMT-510A Foundations of Business (A) 4 Credits**

Prerequisites: None

This course provides the prerequisite knowledge necessary for studying management in Kettering University's Online graduate program. Students are introduced to both a theoretical understanding, and practical application, of concepts in the disciplines of management, marketing, accounting and 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 program.

Lecture: 4, Lab 0, Other 0

**MGMT-521 Statistical and Quantitative Methods for Managerial Decision 4 Credits**

Prerequisites: None

Minimum Class Standing: NA

Terms Offered: Fall, winter, Spring

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

**MGMT-609 Technology Management 4 Credits**

Prerequisites: None

An overview of Management of Technology and Innovation (MTI) and its impact on contemporary management practices is covered. The focus of the course is on the application of skills and knowledge required of managers and technology professionals responsible for technology implementation in a product development environment. The course analyzes the critical aspects of the management of technology and innovation at the product line, business unit, and corporate levels. Case studies and simulations are used to bring to life the critical challenges confronting managers of technology.

Lecture: 4, Lab 0, Other 0

**MGMT-619 Project and Change Management 4 Credits**

Prerequisites: ACCT-518

Managing projects within an organizational context, including the processes related to initiating, planning, executing, controlling, reporting, and closing a project are covered in this course. Project integration, scope, time, cost, quality control, and risk management. Managing the changes in organizations resulting from introducing or revising information systems. Identifying project champions, working with user teams, training, and documentation. The change management role of the IS specialist.

Lecture: 4, Lab 0, Other 0

**MGMT-629 Management Science 4 Credits**

Prerequisites: (MATH-258 or MATH-408) or MGMT-521

A variety of quantitative techniques to facilitate the decision-making process are provided to the manager in this course. Both optimization techniques such as linear programming and stochastic techniques such as waiting-line models and Markov processes are covered. Emphasis is placed on the application of these quantitative techniques to a variety of managerial decision areas.

Lecture: 4, Lab 0, Other 0

**MGMT-639 Managing People & Organization 4 Credits**

Prerequisites: MGMT-550

Students are prepared for management positions in high tech and manufacturing companies. In this overview course, students will be introduced to the most important concepts and issues concerning the management and leadership of high technology staff. Subjects include high tech leadership and communication, change management, lean thinking, HR issues, ethics and persuasion.

Lecture: 4, Lab 0, Other 0

**MGMT-649 Ethics and Leadership 4 Credits**

Prerequisites: MGMT-639

Students are prepared for leadership roles in the workplace and in society by giving them knowledge of management and leadership from an ethical perspective. This course will focus on the evolution of ethical theories and the role of the leader within the business context. Students will use their understanding of business, leadership and the processes of moral reasoning to examine contemporary issues relating to organizations.

Through lecture and case method, students will apply their knowledge of leadership to contemporary situations.

Lecture: 3, Lab 0, Other 1

**MGMT-659 Strategy 4 Credits**

Prerequisites: BUSN-659 and FINC-619 and MGMT-639 and MRKT-679

The capstone business class focuses on the formulation, implementation, and evaluation of organizational policy and strategy from the perspective of the senior manager/strategy planner. Consideration is additionally given to information technology, global operations, ethics, legal perspectives and the functional level strategies of the organization. An integrative approach uses the case method to explore executive decision making in the global marketplace.

Lecture: 4, Lab 0, Other 0

**MGMT-661 Operations Management in Service Organizations 4 Credits**

Prerequisites: MATH-258 or MATH-408 or MGMT-521 or MFGO-619

An exposure to and an understanding of the core concepts and tools of operations management are provided in this course. These concepts and tools will be presented in a manner that will allow students to understand the fundamental importance of coordinated operational activities.

The class will examine how to effectively integrate operations across all functional areas of the organization in delivering the combination of service and manufactured value required to satisfy customers.

Recognition of the importance of adding value and customer satisfaction to the long-term viability of both for-profit and not-for-profit firms will be emphasized.

Lecture: 4, Lab 0, Other 0

**MGMT-665 Strategic Management 4 Credits**

Prerequisites: None

The focus of this course is on strategic investigation, analysis, and planning within organizations. Emphasis is placed on combining analytical and emergent views to produce strategic thinking maps designed to assist leaders in: acknowledging the reality of change, questioning current assumptions and activities, collecting and reviewing data relevant to the industry, and facilitating future organizational development.

Lecture: 4, Lab 0, Other 0



**MGMT-669 Supply Chain Operations 4 Credits**

Prerequisites: None

A conceptual framework for understanding Supply Chain Management (SCM) is provided. 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. Students will use software and case studies to illustrate concepts.

Lecture: 4, Lab 0, Other 0

**MGMT-679 Leadership 4 Credits**

Prerequisites: None

A comprehensive examination of different leadership theories, with emphasis on relevant empirical evidence and application of the theories to case studies that involve leadership and group functioning are covered in this course. Students will thoroughly examine a professional review of concepts and apply their understanding through a variety of means. Ethics and persuasion are covered.

Lecture: 3, Lab 0, Other 1

**MGMT-693 Internship in Management 4 Credits**

Prerequisites: None

Lecture: 0, Lab 0, Other 0

## Marketing (MRKT)

**MRKT-570 Marketing Concepts and Applications 2 Credits**

Corequisites: MGMT-550

Prerequisites: None

An overview of consumer marketing's role in business is provided in this course. Marketing Concepts and Applications are integrated into a marketing discipline that enables students to become effectively engaged in consumer to customer product and service related endeavors.

Lecture: 2, Lab 0, Other 0

**MRKT-679 Marketing Management 4 Credits**

Prerequisites: MRKT-570

An overview of marketing's role in connecting businesses to other businesses is provided in this course. While this course will cover the basic Business Management topics, a special emphasis is placed on the best practices in market relationship management, supply chain management, and strategy development. Cases will be used throughout the course to illustrate various concepts and issues.

Lecture: 4, Lab 0, Other 0

## Mechanical Engineering (MECH)

**MECH-510 Analysis and Design of Machines and Mechanical Assemblies 4 Credits**

Corequisites: MECH-330

Prerequisites: MECH-300 and MECH-310 and MECH-312

Terms Offered: Directed Study

The main aim of this course is to integrate the concepts of kinematic & dynamic analyses to the design of machines and mechanical assemblies used in automotive, medical equipment and other applications. These include (but are not limited to) the analysis and design of reciprocating engine sub-systems such as, piston cylinder mechanism, steering linkages, window and door-lock mechanisms, over-head valve linkage system, flywheel, gears & gearboxes, universal couplings and automotive differential. Synthesis of mechanism systems used in medical equipment area will also be covered. Kinematic and dynamic characteristics such as displacement, velocity, acceleration and forces are analyzed by graphical and analytical methods. CAE tools will be used to perform kinematic, dynamic and stress analyses and fatigue design of these systems using CAE tools. Temperature effects will also be included wherever appropriate in the design. Several practical design projects will be assigned during the term of this course.

Lecture: 4, Lab 0, Other 0

**MECH-512 Mechanical Systems Design Project 4 Credits**

Prerequisites: MECH-300 and MECH-312 and (IME-301 or MECH-307)

Minimum Class Standing: Senior

Terms Offered: Summer, Fall

The fundamental topics of this course include: The engineering design process, ethics, teamwork, brainstorming, conceptual designs, proposal writing, project planning, project management, product attributes, design criteria, engineering targets, physical simulation, virtual simulation, analysis techniques, design synthesis, alternative designs, bill of materials, bill of process, manufacturability, product variations, product quality, design reports and presentations. Note: Satisfies ME Senior Design Project requirement.

Lecture: 4, Lab 0, Other 0

**MECH-514 Experimental Mechanics 4 Credits**

Prerequisites: MECH-300 and MECH-312 and MECH-330 and (IME-301 or MECH-307)

Minimum Class Standing: Senior 2

Terms Offered: Winter, Spring

The primary purpose of this course is to provide fundamental knowledge in the theory and practical experience in the application of mechanical engineering measurements. Viewed as a system, consideration is given to the performance, limitations, and cost of the detection - transducing stage, the signal conditioning stage and the final termination or readout - recording stage. Sensors such as resistive, capacitive or inductive are considered for the transducing stage. Signal conditioning stage emphasizes the use of a Wheatstone Bridge circuit, operational amplifiers and digital processing. The final readout or termination stage considers visual readouts such as analog or digital meters, charts or scopes in addition to memory devices such as computer hard drives and microprocessors. Nearly 2/3 of the time is spent on an approved team project that produces experimental measurements, which adds knowledge or understanding to some theoretical concepts or rhetorical inquiry. Course is structured so as to qualify as a capstone for cognate mechanical engineering students. Others may use it as a technical elective.

Lecture: 2, Lab 0, Other 4



**MECH-515 Failure and Material Considerations in Design 4 Credits**

Corequisites: MECH-412

Prerequisites: None

Terms Offered: Winter, Spring

Designing components that are safe and reliable requires efficient use of materials and assurance that failure will not occur. Even still, components do fail. In this course, students will be introduced to the techniques of designing for life and material considerations involved in that process. In addition, students will also study how to analyze those components which do fail, and evaluate safe-life and remaining life in a design through the study of real-life component design and current failures.

Lecture: 4, Lab 0, Other 0

**MECH-516 Introduction to Finite Element Analysis with Structural Applications 4 Credits**

Prerequisites: MECH-212 and MECH-310 and MECH-330

Terms Offered: Summer, Fall

The theory of the Finite Element Method will be introduced. Applications of static and dynamic finite element analysis of real world mechanical systems will be performed. Commercial F.E.A. codes such as SDRC/I-DEAS and MSC/NASTRAN will be utilized.

Lecture: 4, Lab 0, Other 0

**MECH-521 Energy and Environmental Systems Design 4 Credits**

Corequisites: MECH-422

Prerequisites: MECH-300 and MECH-312 and MECH-420 and (IME-301 or MECH-307)

Terms Offered: Winter, Spring

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-523 Applied Computational Fluid Dynamics 4 Credits**

Prerequisites: MECH-322 and (MATH-313 or MATH-418 or MATH-423)

Terms Offered: Fall

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-525 Introduction to Multiphysics Modeling and Simulation in Fluid Mechanics and Heat Transfer 4 Credits**

Prerequisites: MECH-322 and MECH-420

Terms Offered: Fall, Winter

This course solves a variety of engineering problems with the aid of computational software mainly in the field of fluid mechanics and heat transfer. Pipe flow, incompressible flow, laminar and turbulent flow, drag, and lift are subjects covered during the first part of the course. In the second part, topics in heat transfer are used such as conduction in solids, fin design, convection, heat exchangers, and radiation. In a third part, selected topics in electrical conductive media and reaction engineering are also covered. This course compliments MECH-322 and MECH-420 and could be considered an extension of the two courses where problems are solved in 2D and 3D using computational software. Different types of meshes will be discussed, post-processing of data will be analyzed through graphical techniques, and graphical results will be compared to well-known analytical solutions. Students will also complete a final project where both fluid mechanics and heat transfer physics will be used to solve practical engineering problems.

Lecture: 4, Lab 0, Other 0

**MECH-526 Fuel Cell Science & Engineering 4 Credits**

Prerequisites: MECH-320 and MECH-420

Terms Offered: Summer, Fall

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-527 Energy and the Environment 4 Credits**

Prerequisites: None

Terms Offered: Fall, Winter

Students will be provided the opportunity to perform hands-on laboratory experiments in the area of sustainable energy. The fundamental principles required will be provided prior to laboratory experimentation. Topics covered include but are not limited to PEM and solid oxide fuel cells, energy storage in batteries and ultra-capacitors, heat of combustion and calorimetry, solar-thermal energy and photovoltaics, wind energy, ethanol production from corn and sugar and bio-diesel extraction from algae, a field-trip is also included as a part of this course.

Lecture: 3, Lab 1, Other 0

**MECH-528 Bio and Renewable Energy Lab 4 Credits**

Prerequisites: MECH-322

Terms Offered: Spring, Summer

Students will perform hands-on laboratory experiments in the area of sustainable energy. The fundamental principles required will be provided prior to laboratory experimentation. Topics covered include but are not limited to PEM and solid oxide fuel cells, energy storage in batteries and ultra-capacitors, heat of combustion and calorimetry, solar-thermal energy and photovoltaics, wind energy, ethanol production from corn and sugar and bio-diesel extraction from algae. A field-trip is also included as a part of this course.

Lecture: 2, Lab 2, Other 1

**MECH-540 Introduction to Internal Combustion Engines and Automotive Power Systems 4 Credits**

Prerequisites: MECH-320

Terms Offered: Summer, Fall

The fundamentals of internal combustion engines (ICE) is an introduction to engine design with topics that include: air capacity, engine vibration, kinematics and dynamics of the crank mechanism, air cycles, combustion, petroleum and alternative fuels, engine electronics and fuel cells. Automotive emissions, government standards, test procedures, instrumentation, and laboratory reports are emphasized.

Lecture: 4, Lab 0, Other 0

**MECH-541 Advanced Automotive Power Systems 4 Credits**

Prerequisites: MECH-540

Terms Offered: Winter, Spring

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-542 Chassis System Design 4 Credits**

Prerequisites: MECH-330

Terms Offered: Summer, Spring

The objective of this course is to provide a comprehensive experience in the area of automotive chassis engineering. Students will work in teams to complete a chassis design project applicable to passenger cars or light trucks. The course covers tires and wheels, brakes, suspensions and steering. A vehicle system approach is used in learning and application and the logic of vehicle dynamics and the science of improvement are integrated into the course content. Professional computer-aided engineering tools are introduced and applied in the areas of suspension design and overall vehicle dynamic performance.

Lecture: 4, Lab 0, Other 0

**MECH-544 Introduction to Automotive Powertrains 4 Credits**

Corequisites: MECH-312

Prerequisites: MECH-212

Terms Offered: Winter, Spring

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-545 Hybrid Electric Vehicle Propulsion 4 Credits**

Corequisites: MECH-430

Prerequisites: None

Terms Offered: Winter, Spring

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-546 Vehicle Systems Dynamics 4 Credits**

Prerequisites: MECH-330

Terms Offered: Summer, Fall

This course begins with an introduction of Ride and Handling concepts followed by the study of mechanics' of pneumatic tires. Mathematical models for ride and handling are derived and presented. Vehicle ride and handling design criteria are demonstrated. Chassis design factors (CDF) and their effect on ride and handling are emphasized. Static, Dynamic and proving ground testing will be presented and demonstrated. Computer simulation design using software (e.g. Matlab, Mathcad, ADAMS Working model, SSnap, Car-Sim and others) will be used as an integral part of the course and for the two projects assigned during the semester. Overview on state-of-the-art technology and latest developments in the field of vehicle systems dynamics (e.g.SAE, ASME publications) will be part of this course.

Lecture: 4, Lab 0, Other 0

**MECH-548 Vehicle Design Project 4 Credits**

Prerequisites: MECH-320 and (IME-301 or MECH-307)

Minimum Class Standing: Senior

Terms Offered: Summer, Fall

A comprehensive vehicle design experience progressing from problem definition through ride, handling, chassis design, performance analysis to sketches, alternate design, general design, layout drawings, parts list of the chassis, body, suspension powertrain and culminating with small-scale model of the vehicle and its subsystems. Note: Satisfies ME Senior Design Project requirement.

Lecture: 4, Lab 0, Other 0

**MECH-550 Automotive Bioengineering: Occupant Protection and Safety 4 Credits**

Prerequisites: MECH-310

Terms Offered: Winter, Spring

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-551 Vehicular Crash Dynamics and Accident Reconstruction 4 Credits**

Prerequisites: MECH-310

Terms Offered: Summer, Fall

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-554 Bioengineering Applications Project 4 Credits**

Prerequisites: MECH-300 and MECH-310 and MECH-312 and MECH-350 and (IME-301 or MECH-307)

Terms Offered: Summer, Fall

A comprehensive design experience focusing on a project with direct application to the bioengineering field. The course emphasizes the steps of a typical design process (problem identification, research, and concept generation) culminating in a documentation of the preferred embodiment of the design concept. The conceptual design will then be further developed through the application of sound engineering analysis and tools. Note: Satisfies ME Senior Design Project requirement.

Lecture: 4, Lab 0, Other 0

**MECH-562 Compressible Flow/Gas Dynamics 4 Credits**

Prerequisites: MECH-322

Terms Offered: Spring

The derivation and physical interpretation of the Navier-Stokes equations for compressible flows. Analysis of one-dimensional flows with discussions on normal, oblique, and bow shocks. Sound waves and unsteady wave motion are also covered. The method of characteristic (MOC) is taught and standard JANNAF CFD codes is utilized to understand the compressible flows and shock formation and behavior. The study is then further carried out to nozzle flows and jet/shock layer interaction. The students are required to not only understand the conventional methods used to obtain solution for compressible flow problems, but also to be able to utilize CFD and experimental methods to obtain solution for complex problems.

Lecture: 3, Lab 2, Other 0

**MECH-564 Aerodynamics and Wing Theory 4 Credits**

Prerequisites: MECH-322 and (MATH-305 or MECH-522 or MECH-600)

Terms Offered: Spring

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-572 CAD/CAM and Rapid Prototyping Project 4 Credits**

Prerequisites: MECH-300

Terms Offered: Winter, Spring

Capstone design project course in which students acquire an integrating experience leading them from CAD of a part (designed using sculptured surface and solid modeling techniques), through rapid prototyping of that part (using stereolithography) and into mold or die design and manufacture (using CAD/CAM system such as Unigraphics NX). This course can be used as an ME Elective or Free Elective if another ME capstone course is completed.

Lecture: 4, Lab 0, Other 0

**MECH-580 Properties of Polymers 4 Credits**

Prerequisites: MECH-300 and (IME-301 or MECH-307)

Terms Offered: Directed Study

Thermo-mechanical properties of commodity thermoplastics and includes a review of structure/nomenclature. The course then addresses: polymer shape and size, amorphous and crystalline states,  $T_g$ ,  $T_m$ , rubber elasticity and viscoelasticity (creep). There will be materials' selection and design projects.

Lecture: 4, Lab 0, Other 0

**MECH-582 Mechanics and Design Simulation of Fiber-Reinforced Composite Materials 4 Credits**

Prerequisites: MECH-300

Terms Offered: Directed Study

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-584 Plastics Product Design 4 Credits**

Prerequisites: MECH-300 and MECH-310 and MECH-312 and (IME-301 or MECH-307)

Terms Offered: Directed Study

Capstone design class for Plastics Product Design Specialty students. A comprehensive product plastic design experience beginning with problem definition, which leads to material selection and progresses into physical design. Students will perform structural FEA and mold filling simulations on solid models. Computing piece price and tooling costs will complete the design process.

Lecture: 2, Lab 4, Other 0

**MECH-595 Automotive Seminar I 4 Credits**

Prerequisites: None

Minimum Class Standing: None

Terms Offered: As needed

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

Minimum Class Standing: None

Terms Offered: As needed

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-600 Engineering Mathematics with Applications 4 Credits**

Prerequisites: (MATH-305 or MATH-307) and MECH-420

The objectives of this course are to introduce students to various analytical and numerical methods used in the modeling, analysis, and design of engineering systems. The theory and application of these methods will be introduced. Applications to real-world mechanical and thermal-fluid systems will be performed.

Lecture: 3, Lab 0, Other 1

**MECH-610 Mechanics of Materials I: Linear Elasticity 4 Credits**

Prerequisites: None

Introduction to the general model of deformation and displacements; and, their application to linear elastic solids are taught in this course. The formulation of deformation gradients, displacement gradient, strain, and stress tensors will be discussed. The derivation of the general equation of motion of a deforming solid will be conducted. The general constitutive relation of elastic materials will be introduced. The linearized general deformation measures and constitutive relation will be utilized with the general equation of motion and compatibility conditions to develop the general theory of linear elasticity. The developed theory will then be applied to solve for the deformation and stresses of elastic solids under plane strain, plane stress and beam theory conditions.

Lecture: 3, Lab 0, Other 1

**MECH-611 Mechanics of Material II: Nonlinear Elastic-Plastic Behavior 4 Credits**

Prerequisites: MECH-610

General nonlinear theory of deformation and its application to elastic-plastic behavior of materials is taught in this course. The linear elastic behavior will be reviewed along with its application to deformation of plates and shells. The geometric nonlinear deformation measures will be discussed. The application of the general equation of motion to nonlinear deformation of solids will be conducted. The nonlinear theories of elasticity and plasticity materials will be introduced. The nonlinear deformation measures and constitutive relation will be utilized with the general equation of motion to address the nonlinear deformation of elastic-plastic materials. The developed relations will then be applied to solve for the deformation and stresses of several nonlinear problems.

Lecture: 3, Lab 0, Other 1

**MECH-613 Nonlinear Finite Element Analysis 4 Credits**

Prerequisites: MECH-611

Introduction to the theory and application of nonlinear finite element analysis in engineering design is covered in this course. The classification and formulation of different nonlinear behaviors and computational techniques will be discussed. Material and geometric nonlinear behaviors will be studied. The computational techniques for solving the different classes of nonlinear problems will be formulated. These techniques include implicit and explicit methods. Commercial software will be used to apply the formulated algorithms to the analyses of nonlinear crash and metal forming engineering problems.

Lecture: 3, Lab 0, Other 1

**MECH-615 Engineering Optimization 4 Credits**

Prerequisites: MECH-600

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: 3, Lab 0, Other 1

**MECH-621 Applied Transport Phenomena 4 Credits**

Prerequisites: MECH-420

Introduction to concepts normally not covered in undergraduate Heat Transfer and Fluid Flow courses. Concepts relating to advanced heat convection and mass diffusion, turbulent and laminar boundary layer flows with heat transfer and mass transfer will be introduced. Topics in advanced heat conduction and droplet evaporation will also be introduced. Heat transfer for internal and external flow problems will be considered. The relationship between fluid flow, heat, and mass transfer in engineering systems will be discussed. Analytical and approximate solutions to these problems will be presented.

Lecture: 3, Lab 0, Other 1

**MECH-622 Computational Heat and Mass Transfer 4 Credits**

Prerequisites: MECH-600

Introduction to the use of numerical methods that are commonly used to solve transient, non-linear, three-dimensional engineering problems with complicated geometries. Analytical methods that could be used to solve these types of problems will be presented. Some of these analytical methods can only be used to solve problems with simple geometries and simple boundary conditions. However, numerical methods can be used to solve problems with complicated geometries and boundary conditions. Engineering problems involving several different physical phenomena simultaneously, such as fluid flow with heat transfer and mass transfer, will be considered. In this case, the governing differential equations are coupled and should be solved simultaneously. Methods on how to treat non-linear terms will be discussed. Moreover, the method of staggered grids and upwind schemes that are used to solve fluid flow problems will be presented. For transient problems, implicit and explicit methods will also be presented. The student will be required to write his or her own computer code to implement these methods to solve engineering problems. For very complicated geometries, the student will be required to use a commercial or existing code. The student will be able to relate the computer output to the performance/behavior of the physical system. The limitations and convergence/stability issues associated with these numerical methods will be discussed.

Lecture: 3, Lab 0, Other 1

**MECH-626 Hydrogen Generation, Storage and Safety 4 Credits**

Prerequisites: None

This various methods of hydrogen production are covered: water electrolysis using photovoltaics, steam reformation and partial oxidation techniques of various types of conventional and alternative fuels. Various methods of hydrogen storage – compressed gas, liquefied gas, metal and chemical hydrides and nanotubes are included. Codes for underground and above ground pressurized hydrogen gas storage systems and safety aspects are covered. A comparison is made between hydrogen properties and known conventional fuels such as, methane (natural gas), gasoline, methanol and ethanol. Infrastructure design studies, dispensing transportation, codes and standards are covered. A hydrogen storage/production/safety laboratory for experimental studies is planned to be a major component of this course.

Lecture: 3, Lab 0, Other 1

**MECH-627 Green Energy Conversion 4 Credits**

Prerequisites: MECH-420

Radiant energy transfer from the sun and its application to solar exchangers are covered. Basic theory, energy balances for solar exchangers, economics, and practice of solar energy applications are included. The concepts are applied to renewable energy systems such as solar heating and cooling systems for homes, businesses, and industry. Windmill theory and applications as well as system design are also covered. Data obtained on large scale solar and windmill systems will be analyzed and discussed.

Lecture: 3, Lab 0, Other 1

**MECH-641 Combustion & Emissions 4 Credits**

Prerequisites: MECH-420

Introduction to the basic principles of combustion and how to apply them to basic engineering problems. Various technologies of this field will be explored. However, a large portion of the course will cover the fundamentals of combustion. Topics relating to flame speed, flame thickness, flame spread, flame quenching, blow-off, stabilization, ignition energy, flammability limits, and flashback will be presented. Laminar and turbulent premixed and diffusion flames will be discussed. These topics will be related to combustion and emissions in spark-ignition and diesel engines.

Lecture: 3, Lab 0, Other 1

**MECH-643 Noise, Vibration & Harshness 4 Credits**

Prerequisites: None

An integrated approach to the analysis of Noise, Vibration and Harshness of automotive engineering is presented. Techniques for evaluating the vibration and acoustic characteristics of vehicle systems are discussed. Then the principles of noise and vibrations control are presented through automotive applications.

Lecture: 3, Lab 0, Other 0



# INDEX

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## #

2018-19 Academic Calendar ..... 7

## A

About Kettering University ..... 3

About the Catalog ..... 6

Academic Policies and Regulations ..... 25

Accounting (ACCT) ..... 45

Administration and Faculty ..... 42

Alumni Engagement ..... 41

## B

Business (BUSN) ..... 45

## C

Certificate Programs ..... 19

College of Engineering (Graduate) ..... 9

Computer Engineering (CE) ..... 45

Computer Science (CS) ..... 47

Contact Information ..... 44

Course Descriptions & Numbering ..... 20

## E

Elect. & Computer Engrg (ECE) ..... 47

Electrical Engineering (EE) ..... 47

## F

Family Educational Rights and Privacy Act (FERPA) ..... 37

Financial (FINC) ..... 48

## G

Global Leadership ..... 19

Graduate Admissions ..... 21

Graduate Catalog ..... 2

Graduate Level Academic Programs ..... 9

Graduate School & Research ..... 13

## H

Healthcare Management ..... 19

Healthcare Management (HMG) ..... 48

## I

Indust/Manufctrng Engrg (IME) ..... 48

Information Systems (ISYS) ..... 49

Information Technology ..... 39

## L

Lean/Manufacturing Ops (MFGO) ..... 50

Library Services ..... 40

## M

Management (MGMT) ..... 50

Marketing (MRKT) ..... 52

Master of Business Administration (MBA) ..... 13

Mechanical Engineering (MECH) ..... 52

MS in Engineering (Concentration in Automotive Systems) ..... 10

MS in Engineering (Concentration in Computer Engineering) ..... 10

MS in Engineering (Concentration in Electrical & Computer Engineering) ..... 11

MS in Engineering (Concentration in Electrical Engineering) ..... 12

MS in Engineering (Concentration in Mechanical Engineering) ..... 12

MS in Engineering Management ..... 15

MS in Lean Manufacturing ..... 16

MS in Operations Management ..... 17

## O

Operations Management ..... 19

## S

School of Management/grad/programs/coll-business/ ..... 13

Student Records ..... 37

Supply Chain and ERP ..... 19

## T

Tuition and Fees ..... 24