INFORMATION GUIDE

FOR PARENTS OF PROSPECTIVE STUDENTS

ENTERING FALL 2012

MECHANICAL ENGINEERING DEPARTMENT

76 LOMB MEMORIAL DRIVE

KATE GLEASON COLLEGE OF ENGINEERING

ROCHESTER INSTITUTE OF TECHNOLOGY

ROCHESTER NY 14623-5604

VOICE (585) 475-5181

UPDATED SEPTEMBER 2011

WELCOME TO THE M.E. DEPARTMENT

Dear Parent,

Thank you for working with your son or daughter as they go through the process of selecting a university and a program of study. I realize that the process is time consuming, can be frustrating at times, and is also full of opportunity, and trepidation. I hope that this information guide will help to answer the questions that you may have, and facilitate discussion about career choices and college selection with your child. Your child – a young man or woman – is trying to make one of the most important decisions that they have been faced with up to this point.

Rochester Institute of Technology offers a unique educational experience, one that we feel is of high quality, and embraces certain core philosophies. Only your son or daughter can decide if these core philosophies are in line with their own goals and aspirations. Here in mechanical engineering, we believe that individuals learn to become engineers by practicing engineering – not just by talking about it.

As a result, the first cornerstone of our educational program is our mandatory co-operative education program. Through this program, students completing the five year Bachelor of Science degree in mechanical engineering will complete a full four years of academic study, complemented by one equivalent year of full-time practical experience.

The second cornerstone of our educational program is our focus on career-oriented education. Our program seeks to be a leader in higher education in preparing our mechanical engineering students for successful careers in a global society. We believe that our graduates must possess technical strength in their chosen discipline, and be able to work with individuals from other disciplines in an effective manner.

The Program Educational Objectives are broad statements that describe what graduates are expected to attain within a few years of graduation. The Program Educational Objectives of the Bachelor of Science degree program in mechanical engineering at Rochester Institute of Technology are to have graduates who will:

EO1 practice mechanical engineering in support of the design of engineered systems through the application of the fundamental knowledge, skills, and tools of mechanical engineering.

EO2 enhance their skills through formal education and training, independent inquiry, and professional development.

EO3 work independently as well as collaboratively with others, while demonstrating the professional and ethical responsibilities of the engineering profession.

EO4 successfully pursue graduate degrees at the Master's and/or Ph.D. level.

The ME Department achieves these objectives by:

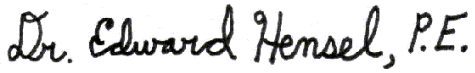
- Integrating cooperative education into the program for all students,
- Providing a strong foundation in mathematics and science with a balance between liberal studies and technical courses,
- Establishing balance between the engineering science, an appropriate computational experience, experimental work, and engineering design components of the program,

- Incorporating a strong laboratory component in the program with outstanding laboratory facilities,
- Having a diverse faculty committed to engineering education,
- Making available a combined BS and Masters option to academically stronger students. This option allows a student to complete the requirements of both the BS and Masters degrees in a five-year period. A student in this option completes four co-op work-blocks, and three courses count toward both BS and Masters degrees.

We seek to engage and motivate our students through stimulating and collaborative experiences. Our mission is to provide technology-based educational programs for personal and professional development. We rigorously pursue new and emerging career areas. As one example of this process of continuous improvement, we have recently launched two new options, the "Bioengineering Option" and the "Energy and the Environment Option" to complement our existing "Aerospace Engineering Option" and our "Automotive Engineering Option." We have lots to share with you, and I welcome you to read this guidebook to learn more about our academic programs, co-curricular offerings, and campus life at RIT.

We hope that this guidebook will provide you with the information that you need as you help your son or daughter through their decision process. Thank you for considering RIT, and best wishes on your college search!

Sincerely,



Edward C. Hensel

Professor and Department Head

Mechanical Engineering – We Design the Future!

RIT AND THE KATE GLEASON COLLEGE OF ENGINEERING

ROCHESTER INSTITUTE OF TECHNOLOGY

As noted in the RIT Archives at Wallace Library, Colonel Nathaniel Rochester and other Rochester community leaders founded the Athenaeum in 1829 as an association "for the purpose of cultivating and promoting literature, science, and the arts." Later, in 1847, The Athenaeum merged with the Mechanics Literary Association, which had been founded in 1836 by William A. Reynolds (son of Abelard Reynolds), to form the Rochester Athenaeum and Mechanics Association. Distinguished speakers during this time period included Charles Dickens, Ralph Waldo Emerson, Oliver Wendell Holmes, and Frederick Douglass. The Athenaeum remains a viable program still today, focusing on educational and cultural experiences for RIT emeritus faculty and staff. As the Rochester Athenaeum and Mechanics Association matured, this led to the founding of the Mechanics Institute in as city leaders, Henry Lomb, Max Lowenthal, Ezra Andrews, Frank Ritter, William Peck and others sought a school to provide technical training for skilled workers for their growing industries. The first class offered at the newly formed Mechanics Institute was mechanical drawing, held in the evening on November 23, 1885. The community response is overwhelming with more than 400 students enrolled. Thus, our department heralds its roots back to the very first class on the very first day of the Mechanics Institute.

In 1903 the Institute consisted of five departments: Industrial Arts, Mechanic Arts and Sciences, language, mathematics, science, Manual Training, Domestic Science and Art, and the Department of Fine Arts with a total enrollment of 3,000. The cooperative education program began in 1912 and continues to be a key component of many RIT degree programs today. In 1916 the first president, Carleton B. Gibson, was appointed, serving until 1916. In 1940 classes were offered all day and all night to train thousands for jobs in the defense industry and enrollment reached 4,565. In 1942 evening classes were opened to women to aid in the war effort as well. In 1944 the institute adopted the name Rochester Institute of Technology.

RIT became the first technical school to offer an associate degree in applied science in New York State in 1950 and in 1955 the first Bachelor of Science degrees were awarded. The first masters degrees were awarded in 1960 (all were master of fine arts). The 1960s also saw a reorganization of the institute into six colleges and the decision to move from downtown Rochester to a new campus in Henrietta, NY.

FACTS AND FIGURES

RIT Student Body	
Fall 2010 Total	17,206
Undergraduate	14,224
Graduate	2,982
Male	11,440
Female	5,766

Degrees Awarded	
2009-2010 Total	3,834
Associate, Diploma, Certificate	429
Bachelor's	2,452
Advanced Certificates	45
Master's	897
Doctorate	11

Faculty and Staff (09-10 School Year)	
Full-time Faculty	1,020
Part-time Faculty	8
Adjunct Faculty	480
Full-time Staff	1,987
Part-time Staff	138
Total	3,633

RIT's campus occupies over 1,300 acres in suburban Rochester, the third-largest city in New York. The campus consists of 243 buildings total (5.6 million sq. ft.). RIT Libraries are comprised of Wallace Library, the Cary Library, and RIT Archives and Special Collections. RIT's Wallace Library is the primary information resource center on campus. It is a multimedia center offering a vast array of resource materials. The library provides access to 200 electronic databases, more than 30,000 electronic journals, and more than 55,000 e-books. Resource materials include 11,000 audio, film, and video titles and more than 498,000 books and print journals.

ALUMNI

RIT alumni number over 106,000 from all 50 states and more than 100 nations.

ATHLETICS

At RIT, men's hockey, basketball, lacrosse, and women's volleyball and hockey are often ranked nationally. Many other RIT teams receive recognition in the Northeast.

Men's Teams—baseball, basketball, crew, cross country, Division I ice hockey, lacrosse, soccer, swimming, tennis, track, and wrestling.

Women's Teams—basketball, crew, cross country, ice hockey, lacrosse, soccer, softball, swimming, tennis, track, and volleyball.

RIT offers a wide variety of activities for students at all levels of ability. More than 50 percent of our undergraduate students participate in intramural sports ranging from flag football to golf and indoor soccer. Facilities include the Gordon Field House, featuring two swimming pools, a fitness center, indoor track, and an event venue with seating for 8,500; the Hale-Andrews Student Life Center, with five multipurpose courts, eight racquetball courts, and a dance/aerobics studio; the Ritter Ice Arena; outdoor tennis courts; an all-weather track; and athletic fields.

ACCREDITATION

RIT is chartered by the legislature of the state of New York, accredited by the Middle States Association of Colleges and Schools. In addition, individual colleges have professional accreditation for specific programs.

KATE GLEASON COLLEGE OF ENGINEERING

RIT's Kate Gleason College of Engineering provides a nurturing educational environment within which to earn a highly marketable degree that serves students well, whether they choose to pursue a career in industry or attend graduate school in engineering or a related field. The college offers undergraduate and graduate programs in a full spectrum of engineering disciplines. The Kate Gleason College of Engineering at RIT is the nation's premier career-oriented college of engineering.

Mechanical drawing classes were offered at the Mechanics Institute in 1885 with classes in electrical engineering following in 1896. In 1912 the department of industrial arts was established to include mechanical, electrical and chemistry courses. By 1940 two departments were established – electrical and mechanical and five years later RIT offered associates degrees in electrical and mechanical technology. In 1953 RIT offered it first BS degrees in electrical and mechanical engineering.

Dr. Edward T. Kirkpatrick was named the first dean of engineering in 1965 and in 1969 ABET accredited the electrical and mechanical engineering BS programs. Dr. Dick Reeve established the industrial engineering department in 1970 and the College of Applied Science changed its name to the College of Engineering in 1971 with Dr. Richard Kenyon as dean in 1972. By 1975 the college of engineering offered ABET accredited BS degrees in electrical, mechanical and industrial engineering, and MS degrees in electrical and mechanical. The year 1975 saw the establishment of computer engineering in conjunction with the School of Computer Science, residing

solely within the college of engineering by 1980. In 1987 ABET accredited the BS in computer engineering program and the newly established microelectronic program – the first of its kind in the world.

Dr. Paul Peterson was named dean in 1990 as the college began joint programs with other colleges at RIT-software engineering with the department of computer science, and design, development and manufacturing with the college of business. In 1998 the college was renamed the Kate Gleason College of Engineering and in 2000 Dr. Harvey Palmer became dean. During this first decade of the new century the college has enjoyed steady growth in enrollment and the establishment of a PhD program in Microsystems engineering – the first of its kind anywhere as well as the new BS degree programs in biomedical and chemical engineering. The engineering complex has expanded several times with the last expansion taking place in 2007. The last few years have seen a growth in the enrollment of women and minorities and the college is enjoying an increase in retention.

The Kate Gleason College of Engineering offers programs to prepare students for present-day industrial and community life, and to lay a foundation for graduate work in specialized fields. This is accomplished by offering curricula which are strong in fundamentals and maintain a balance among the liberal arts, the physical sciences and professional courses.

The College offers five-year cooperative education programs leading to the bachelor of science degree with majors in biomedical, chemical, computer, electrical, industrial, mechanical, and microelectronic engineering. Graduate programs leading to a Master of Science and/or a Master of Engineering degree are offered in all five departments. A Master of Science degree in Applied and Mathematical Statistics is also offered through the Center for Quality and Applied Statistics and a Master of Science in Materials Science and Engineering is offered jointly with the College of Science.

The departments maintain extensive laboratory facilities to provide students with ample opportunity to work with state-of-the-art equipment in their respective fields. The laboratories are equipped to provide meaningful practical experience, offer students the opportunity for independent projects and provide facilities for applied and fundamental research by students and faculty.

RIT's time-honored and distinctive approach to undergraduate education has not changed. We continue to focus on four major principles that underlie and distinguish engineering education at RIT. They are:

- Excellent teaching
- Learning by doing
- Working as a team
- Exploring real-life, industry-inspired problems

These principles drive everything that we do in our classrooms and laboratories. Our cooperative education program (co-op) remains among the leading programs in the world, and our emphasis on this will not waiver. Our faculty's top priority is teaching. They complement their teaching with research and ongoing contact with the world of work.The Dean of the College is Dr. Harvey Palmer. He earned his Ph.D. at the University of Washington and was long associated with the University of Rochester before joining RIT in the summer of 2000.

FACTS AND FIGURES

Fall 2011 Enrollment
2,120 Undergraduate Students
590 Graduate Students
620 First Year Students

Degree Levels Offered
Bachelor of Science (BS)
Master of Science (MS)
Master of Engineering (MEng)
Advanced Certificate (AC)
Doctor of Philosophy (Ph.D.)

Areas of Study Offered
Mechanical Engineering
Chemical Engineering
Electrical Engineering
Computer Engineering
Microelectronic Engineering
Biomedical Engineering
Industrial Engineering
Quality & Applied Statistics

ABOUT KATE GLEASON

Born on November 25, 1865, Kate Gleason was the daughter of a machine-tool factory owner. By the age of twelve, Kate began working in her father's factory. Kate studied mechanical arts at Cornell University, at Sibley College of Engraving, and at Mechanics Institute, now known as the Rochester Institute of Technology. Shortly thereafter, Kate joined her father at Gleason Works, helping to promote her father's business, which became one of the leading sellers of machine tools in the United States. During World War I, Kate Gleason became the first woman president of a national bank and was also named the first woman member of the American Society of Mechanical Engineers. Following her tenure at the bank, Kate concentrated her efforts on developing low cost housing in various locations across the nation. Kate Gleason died on January 9, 1933. Our College is the only College of Engineering in the USA named after a woman.

DEPARTMENT OF MECHANICAL ENGINEERING

While the "mechanical department" was one of the original departments in the Mechanics Institute, we are a relatively young department when we consider the size of our program as it has evolved. For example, our Bachelor of Science degree program in Mechanical Engineering was first accredited in 1969, upon arrival at our new campus in Henrietta, now under the name of the Rochester Institute of Technology. More than 25% of our entire alumni cohort graduated in the nine year period from 2001 through 2009, and nearly half of our alumni base has graduated in the last 20 years. This suggests that we have a large population of alumni who are in early or mid-career stages of their career, and a relatively small population of alumni that have had opportunity to move into senior executive positions.

Mechanical Engineering is a broad discipline, covering such diverse topics as aerospace systems, bioengineering applications, energy systems, systems & controls, transportation, and vehicle systems engineering. The Mechanical Engineering Department at RIT offers a solid foundation in ME fundamentals as well as the opportunity for students to concentrate their studies in one of several specific areas of engineering. In ME classes, students will be exposed to a balance of theory, hands-on experiment, and design. Our laboratory facilities are primarily intended for student use, although most professors participate in ongoing research projects in these same labs. Undergraduate students can become involved with these projects through classes, co-op experiences, or through participation in the dual degree program which allows students to earn both Bachelor's and Master's degrees in a five-year period. With a faculty that includes several recipients of teaching awards, RIT has demonstrated commitment to excellence in education.

In order to help our graduates achieve the objectives of our academic program, we have adopted a number of educational outcomes. Every graduate is expected to demonstrate competency in each outcome by the time that they complete their B.S. degree. The outcomes of the career-oriented Bachelor of Science degree program in Mechanical Engineering at Rochester Institute of Technology are such that all graduates of the program will demonstrate:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The B.S degree in mechanical engineering at RIT is offered predominantly as a day-time residential program, with required co-op experiences integrated throughout the curriculum. Our BS program is designed to take five calendar years to complete, during which students will complete four equivalent academic years on campus, and one year full-time equivalent work experience of co-op education. Students usually complete their first two years of study on a traditional academic year, beginning in September and ending in May. Following conclusion of two years of study, students will begin to alternate between terms on campus, and terms on co-op. The co-op schedule is somewhat flexible, so that students may alternate on single blocks between campus and co-op, or double blocks.

RIT mechanical engineering also offers students an opportunity to pursue two degrees at one time. Students that are accepted to this highly competitive dual degree program may pursue a BS in Mechanical Engineering concurrently with an M.S. in Mechanical Engineering, or they may pursue a BS in Mechanical Engineering concurrently with an M.E. in Mechanical Engineering. Students in the dual degree program complete three, rather than foure co-op experiences, and typically spend 4.5 academic years on campus, rather than 4.0. Many M.S. students will stay past spring of their fifth year to finish and defend their thesis.

At RIT, we have decided to pursue the goal of becoming a role model for engineering schools in the USA with respect to multi-disciplinary design. We have implemented a multi-disciplinary capstone design sequence that provides every student in mechanical engineering with an experience working as a member of a multi-disciplinary design project team at the capstone level. Our model is being embraced throughout the college of engineering, is gaining exposure at the institution level, and has been presented at several national conferences in educational and discipline specific conferences. We believe that our multi-disciplinary design course sequence is among the most comprehensive in the nation, and is continuing to grow in size, quality, and recognition. Since winter quarter of 2002, every student in mechanical, electrical, and industrial engineering has participated in the course. Additional students from computer engineering, micro-electronic engineering, engineering technology, and industrial design have participated on a less formal and individual basis. Over 30 faculty members from the

College of Engineering are actively engaged every year in our capstone design program. We complete nearly 40 design projects annually, with sponsors including faculty research programs, corporate and foundation gifts, government agencies, and even student sponsors. Collectively our students expend more than 25 engineer-years of effort each academic year, on about 35 projects with a total budget exceeding $100,000. Each team typically consists of 6-8 students, a trained student manager, a faculty mentor, faculty coordinator, and a sponsor contact. We are also leading the way with multi-disciplinary design projects at the lower year levels. The KGCOE program in multi-disciplinary design for honors students at year levels 1, 2, and 3 contains many elements that would often be found in capstone design projects at other universities. We are using this learning experience with a group of talented lower-division students to better understand how to teach formal methods of engineering design at lower year levels.

ACCREDITATION

The Bachelor of Science degree program in Mechanical Engineering is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, Telephone (410)347-7700.

CUSTOMIZED PROGRAMS OF STUDY IN MECHANICAL ENGINEERING

The *Aerospace Engineering option* allows for specialized study in the upper-level undergraduate curriculum focusing on engineering aspects of air- and space-borne vehicles. Building on the fundamental courses completed by all mechanical engineering students, a balanced exposure to the aerospace area is gained through a sequence of three required core courses: Intro to Aerospace engineering, Aeromechanics lab, and Aerodynamics and three technical electives such as: Composite Materials, Aerostructures, Propulsion, Flight Dynamics, Orbital Mechanics, Fundamentals of Fatigue and Fracture Mechanics In addition, students choosing this option are expected to work on an aerospace engineering design project in the Senior Design I and II multidisciplinary capstone design courses taken by all mechanical engineering students in the fifth year of study, and to pursue co-op employment in a related field. A decision to enroll in the aerospace option needs to be made *prior* to the start of your fourth year, and you may contact Professor Alan Nye for additional information.

The Mechanical Engineering Department also offers an *Automotive Engineering option*. This option is intended to increase the opportunities for students who want to work for the automotive industry both in co-op and upon graduation. It offers a series of specialized courses including Intro to Auto Design and Manufacturing, Powertrain Systems and Design, Vehicle Dynamics, IC Engines, Control Systems, Fuel Cell Technology, Fundamentals of Tribology and Lubrication, Design of Machine Systems, amd High Performance and Vehicle Engineering. Students choosing this concentration are expected to work on a vehicle technologies senior design project in the Senior Design I and II multidisciplinary capstone design sequence taken in the fifth year of the program, and to pursue co-op employment in a related field. A decision to enroll in the automotive option needs to be made *prior* to the start of your fourth year, and you may contact Professor Alan Nye for additional information.

The *Bioengineering option* consists of one or more biological science electives, a free elective on Contemporary Issues in Bioengineering, and technical electives chosen from offerings such as Aerosol Mechanics in Respiratory Tract, Biomechanics, Biomaterials, Biomedical Device Engineering, Biosensors, and Bio-transport phenomena. Students choosing this option are expected to work on a bioengineering design project in the Senior Design I and II capstone design courses taken by all mechanical engineering students in the fifth year of study, and to pursue co-op employment in a related field. Students planning to study in this option should insure that they select science elective courses in the biological sciences during their first and second year. A decision to enroll in the

bioengineering option needs to be made *prior* to the start of your fourth year, and you may contact Professor Nye, Dr. Lamkin-Kennard, Dr. Day or Dr Robinson for additional information.

The *Energy and the Environment option* provides students with exposure to a wide range of opportunities and careers associated with energy intensive systems, and how they relate to the environment. Students in this option are expected to complete Contemporary Issues in Energy and the Environment, and three of the following Advanced Thermodynamics, Fuel Cell Technology, Refrigeration and Air Conditioning, Internal Combustion Engines, and Sustainable Energy Management and the built environment. Students choosing this option are expected to work on an energy systems design project in the Senior Design I and II capstone design courses taken by all mechanical engineering students in the fifth year of study, and to pursue co-op employment in a related field. A decision to enroll in the energy and the environment option needs to be made *prior* to the start of your fourth year, and you may contact Professor Margaret Bailey or Robert Stevens for additional information.

Students may also attain a minor in many areas at RIT. Most of the departments in the KGCOE offer a minor. Other common minors are in the College of Liberal Arts, College of Science, and the College of Business. The Mechanical Engineering Department is proud to announce a new minor in Chemical Engineering Systems Analysis as well.

Students that perform particularly well in their academic studies may be invited to participate in a *Dual Degree Program*, which will enable them to earn both a Bachelor's and a Master's degree in approximately five years. Students enrolled in the dual degree program are required to successfully complete 228-231 quarter credit hours and must complete four co-op work blocks. Students can be nominated, or apply, for admission to the dual degree program during the winter quarter of their second year. Students in this program begin their co-op experience in the summer at the end of the second year. Admission into the highly competitive dual degree program is based on the student's cumulative grade point average, three letters of recommendation from the faculty, and a personal interview. All students in this program are required to maintain a grade point average of at least 3.2. Additional details about the application process are provided to you during the winter quarter of your second year of study. Under the dual degree program students can complete their BSME degree and a Master of Engineering, Master of Science or a Master in Public Policy.

UNDERGRADUATE ADMISSION TO MECHANICAL ENGINEERING

Undergraduate students may enter the RIT mechanical engineering program in several ways. These include:

1. Direct admission to the RIT mechanical engineering program as a first year student. The majority of our students enter the program in this manner. We admit about 135 students as first-year students annually.

2. Admission to the RIT Engineering Exploration, and Change of Program (COP) into the M.E. department at any time during the first year of study. A significant number of students enter the program in this manner. We typically admit about 60 students from engineering exploration annually.

3. Admission to another program on the campus of RIT, and Change of Program (COP) into the M.E. department. Students wishing to enter the program through this process are evaluated competitively, and on a space-available basis. Students will be required to achieve certain GPA requirements in specified courses to be considered for a change of program into the M.E. department. Students may COP into mechanical engineering from another engineering discipline during the first year of study with very little, if any, "time penalty" towards completion of degree. Students who change programs after the first year of study may require additional time to graduate.

4. Transfer admission into the M.E. program from another campus. Students wishing to enter the program through this process are evaluated competitively, and on a space-available basis. Students transferring with an Engineering Science A.S. degree from another institution usually enter at the third-year level.

Undergraduate students are evaluated for admission by the RIT admissions office. Prospective students are assessed using a variety of metrics, including standardized test scores, high school performance, extracurricular activities, reference letters, and sometimes personal interviews. Questions about freshman admission should be directed to the RIT admissions office. For the past several years, there has been overwhelming interest in entry to the mechanical engineering department, and we have far more applicants to our program than we can accommodate. As a result, all first year admissions to the ME department, and pre-matriculated changes of program into the ME department from another program, are managed by the RIT admissions office. If they request it, prospective students have an opportunity to tour the residential area of the campus and the academic areas of the campus through admissions office programs. Prospective students also regularly visit the department with their parents, as part of their day on campus, and have an opportunity to meet with a faculty member in the mechanical engineering department.

If after visiting RIT, your daughter or son decides to apply to the Mechanical Engineering Department, they need to be certain that they make the correct program selection. In the past, several students have ended up in different programs (particularly Mechanical Engineering Technology) by filling in the wrong program code. Our current program codes are as follows: EMEM – Mechanical Engineering, EMEA – Mechanical Engineering Aerospace Option, EMED - Mechanical Engineering Bioengineering Option, EMEE - Mechanical Engineering Energy and the Environment Option, EMEV - Mechanical Engineering Automotive Option.

We accept transfer students from other institutions into the RIT mechanical engineering department, and rely upon college-level articulation agreements with those programs from which we receive the most students. We have arrangements with Roberts Wesleyan University, Monroe Community College, Finger Lakes Community College, Jefferson Community College, and Alfred Tech.

COOPERATIVE EDUCATION PROGRAM

The College of Engineering at RIT is firmly committed to a quality cooperative education program. The faculty and administration believe wholeheartedly in the value of cooperative work experience as it forms part of the undergraduate education at RIT. Cooperative education [co-op] gives students the opportunity to apply in the workplace what you learn in the classroom, and bring to the classroom what you learn in the workplace.

Students attend classes during the fall, winter and spring quarters of their first and second year. Following the completion of the second year, students will alternate periods of study on campus with periods of co-op employment. The philosophy of the co-op program is to integrate on-the-job work experience with in-the-classroom academic experience to achieve a more well-rounded education. Students entering RIT as first year students in the Fall of 2011 and later will complete their co-op portion of their degree in the semester-calendar format.

Co-op gives you many valuable opportunities. You will be able to undertake various mechanical engineering career options, which will help you make long-term decisions. While taking a break from the classroom, you will be earning a reasonable salary to help pay for your education. Students gain valuable expertise in areas such as oral and written communication, working in a team, and technical skills. Your co-ops will also provide networking opportunities which will give you an advantage when looking for a permanent position after graduation. More

than half of our graduates are offered full time employment with one of their former co-op companies. In a recent survey, more than ninety percent of our alumni cited co-op as an excellent aspect of their career development.

RIT Mechanical Engineering student typically have access to 80-130 job openings each quarter through the Co-op office. Students are also encouraged to seek out additional appropriate opportunities on their own. Most jobs available through the co-op office are in New York State and nearby areas. However, there are opportunities nationally and internationally. Being flexible is important for a successful search! Wages for most students on their first or second co-op period fall between $8 and $13 per hour; this typically increases in later co-ops.

SOME EMPLOYERS WHO HAVE RECENTLY RECRUITED M.E. STUDENTS

AEROSPACE & DEFENSE

Joint Warfare Analysis Center
NAVAIR
Raytheon Company
US Navy
US Marine Corps
US Air Force
Defense Intelligence Agency
BAE Systems
Aerospace Corp.
GE Gas Turbines
Amphenol Aerospace
Boeing (PA, WA & CA)
Hamilton Sundstrand
Kidde Aerospace
General Dynamics
Goodrich Fuel & Utility
Hexcel Pottsville Corp.
Lockheed Martin
Moog
Naval Air Warfare Ctr.
Northrup Grumman Corp.
Parker Hannifin
Pratt & Whitney
Raytheon Aircraft
NASA
Sikorsky Aircraft

AUTOMOTIVE

Harley Davidson
General Motors (Several locations)
Moog
Magna Drivetrain
TRW
Polaris
Daimler Chrysler
Valeo
Toyota
Honda R&D
Borg Warner
Robert Bosch Corp
Cummins Engine
Delphi Automotive
Ford
ITT Automotive
American Axle & Manufacturing
Orion Bus

ENERGY SYSTEMS

Con Edison
BME Associates
Pennsylvania Power & Light
Constellation Energy
Ostrow Electric
National Fuel Gas Company

OTHER

Everest VIT
Intel
Dupont Advanced Fiber Systems
Bose
Anheuser Busch
Procter & Gamble
General Mills
Fisher-Price

BIOENGINEERING/ BIOMEDICAL

Atlantic Testing Laboratories
McNeil Consumer & Specialty Pharmaceuticals
Wilson Greatbatch Technologies
Bausch & Lomb
Johnson & Johnson
Orthoclinical Diagnostics
B.G. Sulzle
Biophan Technologies
Cambrex Bio Science

MANUFACTURING

Remington Arms
Nu-Kote International
Gleason
Cannon Industries
Alstom Signaling
Eastman Kodak
Hansford Manufacturing
Black & Decker (Emhart Power)
General Electric
Harris Corporation
IBM (Several Locations)
INSA (France)
ITT/Goulds Pumps
Johnson Controls
Motorola
Raymond Corporation
Lexmark
Xerox Corporation
Novelis

AN EXAMPLE B.S.M.E. PROGRAM OF STUDY (STUDENTS ENTERING FALL 2012)

RIT will be transitioning from the Quarter-based academic year to a Semester-based academic year with the beginning of the Fall term in 2013. Since you are entering as a first year student in the Fall of 2011, you will complete your first two years of study under the quarter system, and the last three years of your program under the semester system, as illustrated in the Table below:

Year 1	AY 2012-13 Fall Quarter (RIT Study)	AY 2012-13 Winter Quarter (RIT Study)	AY 2012-13 Spring Quarter (RIT Study)	AY 2012-13 Summer Quarter (Vacation)
Year 2	AY 2013-14 Fall Semester (RIT Study)		AY 2013-14 Spring Semester (RIT Study)	AY 2013-14 Summer Semester (Vacation)
Year 3	AY 2014-15 Fall Semester (RIT Study or Co-op)		AY 2014-15 Spring Semester (RIT Study or Co-op)	AY 2014-15 Summer Semester (RIT Study or Co-op)
Year 4	AY 2015-16 Fall Semester (RIT Study or Co-op)		AY 2015-16 Spring Semester (RIT Study or Co-op)	AY 2015-16 Summer Semester (RIT Study or Co-op)
Year 5	AY 2016-17 Fall Semester (RIT Study)		AY 2016-17 Spring Semester (RIT Study)	AY 2016-17 Summer Semester (Graduated!)

Mechanical engineers apply principles of physical science and mathematics to conceive, design, produce and operate the moving parts, components and machinery used in every aspect of modern life. From rockets, robots and automobiles to power plants, engines, air-conditioning equipment and biomechanical parts, mechanical engineers put energy and machines to work, and wherever there is motion, you'll find evidence of their innovations. Today, they often use computer-aided design and computer simulation to ensure their products are reliable, efficient and economically sound. The spectrum of professional activity for the mechanical engineer runs from research through design and development to manufacturing and sales.

In our program, you'll be encouraged to experiment in many areas, including thermal systems, applied mechanics, computer-aided-manufacturing, systems analysis, robotics, vibration and automotive and aerospace engineering. Because many courses require you to build a model or working prototype to demonstrate a particular concept, you will make extensive use of our well-equipped facilities. Our labs contain dynamic system simulators, spectrum analyzers and high-tech equipment for measuring fluid velocities and particle size and for measuring drag and lift in a wind tunnel.

Because of their comprehensive training and education, mechanical engineers are often called upon to assume management positions. It is not uncommon for the CEO of a Fortune 500 manufacturing company to have started his or her career as a mechanical engineer. When you graduate from RIT's mechanical engineering program, you'll join our successful alumni who work as researchers, prototype designers, product developers, automotive engineers, aerospace engineers, biomedical engineers, management consultants and in many other positions of leadership in every major industry.

B.S. DEGREE CHECKLIST (STUDENTS ENTERING FALL 2012)

The checklist below provides a list of the course requirements each student needs to complete along their way to the BS Degree in mechanical engineering.

Course Names / Topics (Quarters) OR (Semesters)

One year of differential and integral calculus
(Calc I, II, III) **OR** (Calc 1, 2)
Differential Equations
Multi-Variable Calculus
Linear Algebra
Boundary Value Problems
Applied Statistics
Three Science Courses, including at least one with lab (e.g. Physics I, Physics II, Chemistry)
(Materials Processing and Engineering Design Graphics) **OR** (Engineering Design Tools)
(Problem Solving w/ Computers and Meas. Instrum. & Controls) **OR** (Engineering Mechanics Lab)
Statics
(Mechanics and Lab) **OR** (Strength of Materials and Lab)
Dynamics
Thermodynamics I
Fluid Mechanics I with Lab
Heat Transfer I
Numerical Methods
Circuits 1 + Lab (from the EE Department)
Materials Science And Applications with Lab
System Dynamics
Engineering Applications Lab
Senior Design I
Senior Design II
M.E. Lower Division Elective I
M.E. Lower Division Elective II
M.E. Upper Division Elective I
M.E. Upper Division Elective II
M.E. Upper Division Elective III
Free Elective I
Free Elective II
Freshman Writing
Arts of Expression **OR** Freshman Seminar
Humanities I **OR** Perspectives I
Humanities II **OR** Perspectives II
Social Sciences I **OR** Perspectives III
Social Sciences II **OR** Perspectives IV
Univ. A&S Concentration I
Univ. A&S Concentration II
Univ. A&S Concentration III
KGCOE Writing Exam
Co-Op Preparation Course
48 weeks of Co-Op Work Experience and Work Reports
(with at least two blocks during the AY)
Wellness Requirement I
Wellness Requirement II

MECHANICAL ENGINEERING OPTIONS

Because mechanical engineers pursue many different paths during their career, we have developed several options that allow students to customize their program of study. As a mechanical engineering student, you may choose to mix and match courses from all of the options, to create a cusomt program of study tailored to your interests. Or, if you wish to prepare yourself for a particular career path, you can choose one of the four undergraduate options available in our department, or one of the more than one hundred minors available on campus!

AEROSPACE ENGINEERING OPTION

The mechanical engineering program offers professional electives that allow you to tailor your curriculum to your career aspirations. The aerospace engineering concentration begins in your fourth year and focuses on engineering aspects of airborne vehicles and spacecraft. You'll take an introductory course in aerospace engineering followed by elective courses from a wide range of fields such as aerodynamics, aero-structures, composite materials, propulsion, flight dynamics and orbital mechanics. For your capstone senior design project, you are expected to work on an aerospace engineering project. Students interested in airborne vehicles often participate in our Aero Design Team.

The Aero Design Club is a very active student organization in the ME department, that welcomes members from all across campus. The club engages in several side projects in addition to their competitions. The RIT Aero Design and the RIT Imaging Science Club collaborated on the construction of a large model aircraft capable of carrying a variety of payloads. Its primary purpose was to provide a platform for taking aerial video footage for both in-flight and ground shots. The plane was outfitted with GPS equipment and the appropriate hardware to allow over-the-horizon flight. The RIT Blimp can be seen at Tiger Hockey Games entertaining the crowd between periods. Sometimes it seems entertaining entails crashing into the ice or the crowd itself, but that is beside the point. A project led by our friends at the Imaging Science Club, the blimp is approximately 10 feet long and has tri-axis control for easy maneuverability. The blimp broadcasts live aerial footage via the RIT Student Government Channel. The air currents in a packed ice arena make piloting the blimp a bit of a challenge, especially with several pounds of imaging and transmitter equipment strapped aboard. Look for it at RIT Tiger Hockey Games near you! In order to support the newer competition planes, it became necessary to create some custom lightweight, low-power electronics systems

AUTOMOTIVE ENGINEERING OPTION

The complexity of modern mechanical engineering can be seen in the design of an automobile, which entails not only the design of the engine but also of all components such as the steering, braking and lighting systems, transmission, controls and body, including details like the door latches and dashboard display. This option includes an introduction to automotive design and manufacturing followed by courses such as vehicle dynamics, internal combustion engines, and fuel cell technology.

All students complete a 2-semester multi-disciplinary design project during theirDescription: Senior Design Data Logger Project last year on campus. For automotive option students, we insure that their design project is in the automotive field. Many other courses, such as design for manufacturing, system dynamics, solid modeling (CAD), advanced computational techniques all directly contribute to their career in automotive systems engineering.

Our students are encouraged to participate in extracurricular activities, including the SAE Formula Racing Team, and are eligible to join the team in their first quarter on campus. If you are interested in off-road vehicles, check out the RIT Mini Baja competition team.

Students in our automotive program have opportunities to work all over the world, both for the co-operative education and full-time employment.

ENERGY & THE ENVIRONMENT OPTION

This option consists of a series of electives that provides students with exposure to a wide range of opportunities and careers associated with energy intensive systems, and how they relate to the environment. Students in this option will complete a free elective on Contemporary Issues in Energy and the Environment, and select three technical electives chosen from a variety of offerings such as Advanced Thermodynamics, Direct Energy Conversion, Fuel Cell Technology, and Heating Refrigeration and Air Conditioning. Students choosing this option are expected to work on an energy systems design project in the Senior Design I and II capstone design courses taken by all mechanical engineering students in the fifth year of study, and to pursue co-op employment in a related field.

BIOENGINEERING OPTION

The option consists of one or more biological science electives, a free elective on Contemporary Issues in Bioengineering, and three technical electives chosen from a wide variety of offerings such as Aerosol Mechanics in Biological Systems, Biomechanics, Biomaterials, Artificial Organs, biosensors, and bio-transport phenomena. Students choosing this option are expected to work on a bioengineering design project in the Senior Design I and II capstone design courses taken by all mechanical engineering students in the fifth year of study, and to pursue co-op employment in a related field.

Students planning to study in this option should insure that they select science elective courses in the biological sciences during their first and second year. A decision to enroll in the bioengineering option needs to be made prior to the start of your fourth year, and you may contact Professor Nye for additional information. Many students in this option elect to participate in our Human Powered Vehicle (Moon-buggy) competition team in the department.

ELECTIVES IN MECHANICAL ENGINEERING

Every ME student takes two lower divsision electives and three upper division electives in mechanical engineering, to customize their program of study.

Lower Division Electives (select two courses from the list below)

- Automotive Engineering Option Required LDE's
  - (Intro to Auto Design & Manufacturing) **OR** (Contemporary Issues in Automotive Engineering)
  - (Design of Machine Elements) **OR** (Machine Design I)
- Energy & Environment Option Required LDE's
  - Contemporary Issues in Energy & Environment
  - Thermodynamics II
- Bioengineering Option Required LDE's
  - Contemporary Issues in Bioengineering
  - Biomaterials
- Aerospace Engineering Option Required LDE's
  - Introduction to Aerospace Engineering
  - Aerodynamics
- General Lower Division Electives
  - Advanced Computational Techniques
  - (Transport Phenomena) **OR** (Fluid Mechanics II)

Upper Division Electives (select three courses from the list below)

Aerospace Engineering Option
Propulsion
Flight Dynamics
Orbital Mechanics
Aerostructures
Composite Materials
Classical Control Systems
Applications of Finite Element Analysis

Bioengineering Option
Biomedical Device Engineering
Biological Applications of Fluids
Computational Fluid Dynamics
Classical Control Systems

Energy & Environment Option
Refrigeration and Air Conditioning
Turbomachinery
Renewable Energy Systems
Sustainable Energy Management
Fuel Cell Technology
Classical Control Systems
Wind Power Engineering
Engineering Economics (IE Dept.)

Automotive Engineering Option
Internal Combustion Engines
High Performance Vehicle Engineering
Powertrain Systems and Design
Vehicle Dynamics
Design of Machine Systems
Applications of Finite Element Analysis
Advanced Solid Modeling and Design
Robotics
Fuel Cell Technology
Classical Control Systems
Introduction to Optimal Design
Introduction to Engineering Vibrations

MECHANICAL ENGINEERING DUAL DEGREE PROGRAMS

In addition to the Bachelor of Science and Master of Science degree programs, two dual degree programs are available to exemplary mechanical engineering students. These programs offer outstanding students an opportunity to earn both a Bachelor's and a Master's degree within approximately five years of entry to the BS program. Three dual degree programs are available – one leading to a Bachelor of Science and a Master of Engineering degrees (BS/MEng), and two others leading to a Bachelor of Science and a Master of Science degrees (BS/MS). The BS/MEng program has a strong career oriented focus, and is primarily directed towards students not considering continued graduate study at the doctoral level. The BS/MS program has a strong research oriented focus, and is primarily directed towards students planning on completing a doctoral degree. The third leads to a Bachelors of Science, Technology, and Public Policy through the College of Liberal Arts. The BS Mech E/MS STPP has a public policy research focus. All students enrolled in the BS/MS program are required to complete a graduate thesis and conduct scholarly research.

Students enrolled in the dual degree program are required to successfully complete the course requirements for both the BS and Master's degrees simultaneously, usually requiring nine semesters of academic study, and three semesters of co-op. A student may apply for admission to this program in Decmber of their second year. A transfer student may apply after completing one year at RIT. Admission is based on the student's cumulative grade point average, which must be at least 3.2; two letters of recommendation from the faculty; and a letter of application from the student. Students are admitted first to the BS/MEng program, and may change to the BS/MS program upon approval of a thesis proposal. All students in the program are required to maintain both a current and cumulative grade point average of at least 3.0.

One example of how a student might complete the BS/MEng program of study is illustrated in the table below:

Year 1	AY 2012-13 Fall Quarter (RIT Study)	AY 2012-13 Winter Quarter (RIT Study)	AY 2012-13 Spring Quarter (RIT Study)	AY 2012-13 Summer Quarter (Vacation)
Year 2	AY 2013-14 Fall Semester (RIT Study)		AY 2013-14 Spring Semester (RIT Study)	AY 2013-14 Summer Semester (Vacation)
Year 3	AY 2014-15 Fall Semester (RIT Study)		AY 2014-15 Spring Semester (Co-op)	AY 2014-15 Summer Semester (Co-op)
Year 4	AY 2015-16 Fall Semester (RIT Study)		AY 2015-16 Spring Semester (RIT Study)	AY 2015-16 Summer Semester (Co-op)
Year 5	AY 2016-17 Fall Semester (RIT Study)		AY 2016-17 Spring Semester (RIT Study)	AY 2016-17 Summer Semester (Graduated!)

M.E. UNDERGRADUATE STUDENT ADVISING, AND MENTORING

All undergraduate students in the mechanical engineering program are assigned to an academic advisor. Direct admit mechanical engineering first year students are assigned to a learning community cohort during June prior to their arrival. The department head and administrative staff of the ME office construct a Fall schedule of classes for all incoming first year students. To the greatest extent possible, we try to block schedule our incoming students with their learning community cohort. We use indicators such as the RIT math placement examination, their admissions profile, expressed preferences for an option (such as Aerospace, Bioengineering, Energy and the Environment, or Automotive), and assessment of AP credit to both construct a schedule of classes, and place the students in a peer group that will give them a higher opportunity for success. Our students receive letters from the ME department head during the summer, and also get communications from our office staff about their schedules, AP credits, etc.

First year students are welcomed to campus prior to the beginning of the fall term, as part of the "RIT Week of Welcome." RIT Orientation consists of many events for students and parents, and represents an opportunity for the students to get familiar with the campus before getting busy with school work. During Orientation, the RIT Kate Gleason College of Engineering hosts Engineering Day – a fun event that introduces each freshman seminar group to their faculty advisor, and typically another faculty helper. Thus, the intent is for every first year ME student to meet their faculty advisor in a social setting before classes even begin. Students coming into ME from the engineering exploration program are assigned a primary faculty advisor in the ME Department.

During the first year, students work with their learning community cohort of students sharing a common faculty advisor. Each term during the first year, a "Dean's Hold" is placed on every first year student's Student Information System (SIS) account, that prevents them for registering for classes. We require every first year student to meet with their faculty advisor prior to being allowed to register for classes. The faculty advisor informs the ME office staff when each meeting has been completed with their advisees, and then the "Dean's Hold" is removed, so that students can register. The intent of this process is to get students in the habit of conferring with their faculty advisor on a regular basis, particularly as related to academic advising, course selection, and career planning.

Advising in the ME program is greatly enhanced by our office staff. Diedre Livingston, Diane Selleck and Sherril Anderson of our office regularly earn accolades from students for their efforts in helping with everything from class registration and writing exams to co-op reports and planning for the future. The KGCOE regularly conducts advising surveys of our students, and we use the results to identify strengths and weaknesses in our advising system. Our goal is for students to continue working with the same advisor that they initially were assigned to upon entry to our program, until they graduate. Naturally, some students get to know another faculty member later in their academic career, and may request change to another advisor. We accommodate those requests. In addition, when undergraduate students admitted to the dual degree program (BS/MS) identify a thesis topic, their advisor is changed at that time.

Students entering the department as a change of program (other than from engineering exploration) typically come into the ME program after the freshman seminar sequence is complete. In that case, the Associate Department Head meets with the individual student, and they are assigned to an advisor in the ME department. We assign these students based on their academic year level, and open advising slots available to the faculty member.

RIT operates an "Early Alert" system in classes all across campus. With this system, a faculty member in any class can communicate with a student they view at risk. The instructor may easily copy the student's advisor, home department head, and other support services as needed. The instructor of each class is expected to notify students that they are at risk and recommend remedial actions to improve things. When advisors see a pattern of early alerts (e.g. both math and science are getting bad grades at mid-term), or a recurring theme of a particular problem (e.g. the student misses many classes), they are encouraged to invite the student in for a frank and open discussion of the issues. If students are non-responsive to faculty requests for a meeting, then the department has the option of placing a "Dean's Hold" on the student account to verify that the proper follow up is being taken.

Every term, the academic progress of our students is assessed. At the conclusion of grade reports each term, we prepare a list of probations and suspensions. In addition, we review several times each year the list of students receiving a grade of D, F, or W in courses. We use all of these as indicators of at-risk performance. We have observed a strong negative correlation between first year students earning at least one D, F, or W and their subsequent likelihood of completing a degree in their original discipline. Thus, we are now focusing a great deal of effort on identifying these at-risk students and trying to mitigate problems before they make it to the position of probation or suspension.

Students on academic suspension may be required to leave campus for one academic year. When students are informed of suspension, they are invited to apply for a waiver of suspension through the ME Department. During the appeal meeting, we usually arrive at one of several outcomes: (1) the suspension is upheld – usually the case for a second occurrence, (2) the suspension is waived – and a series of proactive measures are implemented in concert with the faculty advisor, (3) the student is referred to the College Restoration Program – the preferred response that allows students to build study skills and perhaps take one engineering class, (4) the student is referred to the Career Exploration Program – preferred when we suspect that students may not really be suited for or interested in an engineering and technology career, or (5) the student is out-placed to another academic program, often on a probationary basis. Most of the students leaving the ME program go into the Mechanical Engineering Technology program, although Civil Engineering Technology, Packaging Science, and Industrial Design are also fairly common selections. Students on waiver of academic suspension are not normally allowed to make forward progress on their engineering and technical courses – rather they are required to spend at least one quarter re-building their foundation, and bringing their GPA back up to appropriate levels. The department often requires the student to agree to bi-weekly update meetings with their faculty advisor until the time that their GPA is back in good standing. This has proven to be an excellent tool to track students recovering from suspension, and has resulted either in solid recovery for the student, or confirmed that out-placement is the correct option. When students are enrolled in other programs, such as ROTC, NTID, or the College Restoration Program, support personnel from those programs are consulted, and included in the discussions.

Class withdrawals are handled very effectively in the ME program. Prior to the eighth week of the academic term (but after the first week add/drop period), students wishing to withdraw from a class meet with their faculty advisor. The advisor is expected to discuss the implication of the course withdrawal with the student, indicate the impact this may have on the student's program of study, and then refer the student to the departmental office. The student may withdraw from courses using the on-line system. After the eighth week of the academic quarter, students must typically provide an exceptional reason for late withdrawal from a class. The Department Head confers with the Associate Dean to determine if the request should be honored. Late withdrawals are commonly approved for reasons of illness, family tragedy, or other circumstances beyond the student's control.

MECHANICAL ENGINEERING STUDENT ORGANIZATIONS

Pi Tau Sigma
Pi Tau Sigma is the mechanical engineering national honor society. Membership, by invitation, is open to men and women ranked in the upper third of the class in their fourth and fifth years at RIT. Chapter activities are tailored to foster high ideals in the engineering profession, support departmental activities, and promote professionalism. Service activities are supported by fund-raising and social events. Professor Walter is the advisor.

Tau Beta Pi
This national engineering honor society was founded to mark in a fitting manner those who have conferred honor upon their Alma Mater by distinguished scholarship and exemplary character as students in engineering, or by their attainments as alumni in the field of engineering, and to foster a spirit of liberal culture in engineering colleges. Election to Tau Beta Pi is one of the highest honors that can come to an engineering student from his or her peers. Professor Nye is the advisor.

American Society of Mechanical Engineers [ASME]
The student chapter of ASME offers educational, technical, and social activities. It develops leadership skills and leads to contacts with engineers in industry and students at other colleges within the region. The student chapter is active and works closely with the senior section in Rochester. The faculty advisor is Professor Timothy Landschoot.

Society of Automotive Engineers [SAE] and FSAE Competition Team
The purpose of the RIT Society of Automotive Engineers is to give students the opportunity to meet with senior engineers in industry and provide students a chance to apply their classroom knowledge in various projects. The faculty advisor is Dr. Nye.

Society of Women Engineers [SWE]
The Society of Women Engineers at RIT is a student-run organization. SWE organizes several functions each quarter such as guest speakers, high school outreach, community activities, tours, social events and events with other student organizations. The RIT chapter is strongly committed to the encouragement of women in pursuing a career in engineering or related fields. The faculty advisor is Professor Lam.

Society of Hispanic Professional Engineers [SHPE]
The Society of Hispanic Professional Engineers is an association of professionals and students in engineering, science, technology, business and other related disciplines at RIT. SHPE's basic thrust is to identify and promote professional growth opportunities for Hispanics. The advisor is Rohan Palma.

National Society of Black Engineers [NSBE]
The student chapter of the National Society of Black Engineers is dedicated to the retention, recruitment, and successful graduation of its members. The advisor is David Watson.

Aero Design Club
The student chapter is dedicated to promoting careers and opportunities in the aerospace industry. The faculty advisor is Dr. Jason Kolodziej

MECHANICAL ENGINEERING GRADUATE PROGRAMS

At the graduate level, we offer both the Master of Science (M.S.) and Master of Engineering (M.Eng.) Degrees in Mechanical Engineering. Both the M.S. and M.Eng. degrees are available for study in a dual degree program mode. During the winter quarter of their second year, undergraduate (B.S.) degree students are invited to apply for admission to the dual degree program. Those students who are accepted into this highly competitive, and demanding, program pursue a Bachelor's and a Master's degree concurrently. Students in the dual degree programs complete four co-op segments, rather than five, and typically spend a total of 14 academic quarters in classes. As the engineering marketplace becomes more globally competitive, we are finding that large numbers of our students elect to complete both the B.S. and the M.Eng. degrees, to place them in a stronger position as they start their careers.

The Master of Science degree program has a strong research oriented focus, and is primarily directed towards students planning on completing a doctoral degree or advanced research careers in industry. All students enrolled in the M.S. program are required to complete a graduate thesis and conduct scholarly research. Students are required to complete two courses Math 1, Math 2, and must select one focus area from among three offered. Each student must then complete three core courses specified in their selected focus area. The department currently offers three focus areas including: Mechanics and Design, Systems and Controls, and Thermo/Fluids.

The Master of Engineering degree program has a strong career oriented focus, and is primarily directed towards students seeking additional technical training, career development, and broadening their skills base. The M.Eng. degree does not include a thesis. All students enrolled in the M.Eng. program are required to complete Math 1, Math 2, Systems Modeling, Computer Implementation of FEM, and a Capstone Experience. Students must select a focus area from one of numerous choices, such as thermo-fluids, controls, mechanics and design, manufacturing, business, and a customized program of study. The focus area may be significantly interdisciplinary. By design, a student's program may range over several colleges of the Institute in assembling

MECHANICAL ENGINEERING RESEARCH PROGRAMS

Research programs play an important part of high technology education, particularly at the Master's degree level. While RIT is not a traditional research oriented university, we insure that our faculty remain current in their professional discipline, and provide meaningful research opportunities for our dual degree and graduate students to pursue. Our research programs often involve undergraduate students to a far greater extent than those of many other mechanical engineering programs, and typically have a very strong applications-oriented focus. A few of the research programs that our undergraduate and dual degree students participate in are summarized here.

ENERGY AND ENVIRONMENT

The Energy and Environment focus area is closely related to developing a ''Clean Energy Economy'' -- a cornerstone of President Obama's administration, as evident by this quotation from the US White House web site: ''So we have a choice to make. We can remain one of the world's leading importers of foreign oil, or we can make the investments that would allow us to become the world's leading exporter of renewable energy. We can let climate change continue to go unchecked, or we can help stop it. We can let the jobs of tomorrow be created abroad, or we can create those jobs right here in America and lay the foundation for lasting prosperity.'' According to the U.S. Census Bureau, energy expenditures in the USA exceeded $1,042 trillion in 2005. There can

be little doubt of the importance of both fundamental and applied research in sustainable energy systems. Faculty and students conduct basic and applied research, including pilot scale demonstrations, in the six functional areas necessary for sustainable solutions to the nation's energy needs: energy collection, conversion, storage, distribution, control, and consumption. Research efforts will range from the fundamental understanding of micro-scale and nano-scale fluid, mass, and energy transport to pilot-scale testing and computer modeling of industrially- relevant sustainable energy systems. Existing infrastructure within the KGCOE to support research in this focus area include the Brinkman Machining & Manufacturing Lab, Thermal Analysis and Microfluidics lab, and the Semiconductor Manufacturing and Fabrication Lab.

Key M.E. Faculty in support of E&E:

- Dr. Margaret Bailey
- Dr. Mario Gomes
- Dr. Satish Kandlikar
- Dr. Ali Ogut
- Dr. Frank Sciremammano
- Dr. Robert Stevens
- Dr. P. Venkataraman

BIOENGINEERING AND HEALTH CARE

The Bioengineering and Healthcare (BioH) Systems focus area aligns with the Institute's BioX initiative and supports the recent strategic alignment with Rochester General Hospital. Students in the BioH track will apply the fundamental knowledge of their respective disciplines to the bio- and health-related areas; with research projects focused on the technological challenges inherent in developing enhanced imaging systems, assistive devices, systems and methodologies to diagnose and treat diseases, and optimization of the delivery and quality of healthcare processes and services The KGCOE departments have already devoted significant resources to support BioX initiatives, including faculty recruitment, laboratory space and startup funding. In addition, collaborative relationships have been established with several faculty members from outside the KGCOE; in particular, the College of Applied Science and Technology and the College of Science, NTID, Rochester General Hospital, University of Rochester, and multiple industry sponsors. These partnerships have resulted in joint proposal submissions, funded projects and publications. Existing infrastructure within the KGCOE to support research in this focus area include the Bio-Fluids Visualization lab, Brinkman Machining & Manufacturing Lab, Human Performance Lab, the Semiconductor and Microsystems Fabrication Lab (SMFL), and new facilities in CBET and Institute Hall to support biomedical and chemical engineering research.

Key M.E. Faculty in support of BioH:

- Dr. Steven Day
- Dr. Elizabeth DeBartolo
- Dr. David Gee
- Dr. Mark Kempski
- Dr. Kathi Lamkin-Kennard
- Dr. Risa Robinson
- Dr. Michael Schrlau

VEHICLES, TRANSPORTATION SYSTEMS AND LOGISTICS (VTSL)

The Vehicles, Transportation Systems, and Logistics focus area encompasses all types of vehicles and materials in motion, relates to a wide variety of applications, and involves multiple disciplines across the College and the Institute. These classes of systems include but are not limited to automotive, ground-based vehicle systems; underwater vehicles; aerospace systems, including both flight and space vehicles; robotic systems; micro vehicles for land, sea, and air applications; intelligent manned and unmanned vehicles under automatic control; remotely operated vehicle systems; freight transport systems including both air and ground; data systems for transportation applications, including data gathering and fusion of data; sensor systems for estimation of vehicle state information; infrastructure used for transportation systems; and system/combination of vehicles acting cooperatively. Example applications of these systems include clean green vehicle motion systems using fuel cells and alternate energy; intelligent highway systems; advanced production systems; intermodal transportation and logistics using a system of vehicles including freight, people, and data gathering/fusion; autonomous flight vehicles for fire control, surveillance, and military operations; manufacturing methods and state-of-the art production systems; fire trucks and safety vehicles; Unmanned Aerial Vehicles (UAVs), navigation systems and related sensors; and biological inspired vehicles. Two cross-cutting societal issues that will be addressed within the context of this focus area are next-generation personal transportation systems and optimal strategies for achieving homeland security. Additionally, this research area has a tight synergistic relationship with the Energy & Environment focus area from the perspective of developing energy efficient transport systems for people and materials.

There are a large number of specialized as well as centralized laboratory facilities within the KGCOE that are currently supporting research in this focus area. These include the Advanced Systems Lab, Control Systems Lab, Robotics and Instrumentation Labs, Wind Tunnel Lab, System Dynamics Lab, Hybrid Sustainable Energy Systems Lab, Vibrations Lab, Fuel Cell Lab, Dynamometer Lab, the Aerostructures Lab, the SMFL, the Brinkman Lab and Manual Machine Shop, and the Toyota Production Systems lab. In addition, several RIT student clubs have an educational and potential research affiliation related to the Vehicle/Transportation Systems focus area such as: RIT's Formula SAE Racing Team; Model Railroad Club; Aero Design Club; Mini-Baja Club; Moonbuggy Team; Heavy Lift Flight Vehicle Club; Micro Air Vehicle Team; and the Robotics Club Team.

Key M.E. Faculty in support of VTSL:

- Dr. Stephen Boedo
- Dr. Agamemnon Crassidis
- Dr. Amit Ghosh
- Dr. Surendra Gupta
- Dr. Jason Kolodziej
- Dr. Alan Nye
- Dr. Benjamin Varela
- Dr. Wayne Walter

MECHANICAL ENGINEERING CONTACT INFORMATION

MECHANICAL ENGINEERING ADVISING CONTACTS

The Mechanical Engineering Department views academic advising as an essential component of the undergraduate experience. Students are assigned a faculty advisor (listed on the Student Information System (SIS) as the first advisor) and a staff advisor (listed on the Student Information System (SIS) as the second and/or third advisor) to every student to assist with academic, social and professional needs.

Your faculty advisor is your first point of contact for anything that is related to the mechanical engineering field. You should see your faculty advisor for assistance with course selection, co-ops, course content or career choices. Faculty are available during posted office hours and by appointment to discuss your advising questions. Each faculty member is an engineer, and they can help you to put some professional perspectives on your academic studies. In particular, your faculty advisor can help you select the appropriate technical electives and options that will help you achieve the personal and professional goals that you have established for yourself. Your faculty advisor has been through the courses you are taking, and may be able to suggest study skills and approaches to help you be successful. If you experience any problems related to your coursework, remember that the best time to see your advisor is before problems get big, so that the two of you can decide on a course of action to solve them while they are more easily manageable.

Your staff advisor is responsible for providing resources for faculty advisors and implementation of the overall advising program for the department. You should see your staff advisor if you need assistance with course scheduling, academic performance issues, learning community schedules, transfer credit or life at RIT. The staff advisors are not engineers, but they understand the RIT registration processes and degree completion requirements. Staff advisors can often answer most logistical questions that you may encounter related to registration. Staff advisors are not in a position to provide technical advice on specific courses, or how those courses may relate to your professional career opportunities. Staff advisors are well aware of the various resources available around the campus, and can help you connect with study centers and assistance resources of both an academic and personal nature.

MECHANICAL ENGINEERING STAFF POINTS OF CONTACT

Edward Hensel is the Department Head of Mechanical Engineering. He is responsible for the overall direction and management of the department and its programs in Rochester and Dubai. Dr. Hensel supervises all faculty and staff in the department, manages all cases of academic misconduct in the ME department, and also is responsible for recognitions of outstanding performance.

Alan Nye is the Associate Department Head for outreach and experiential learning. He is responsible for all transfer students, 2/3 students with combined study between two campuses, and all questions related to change of program in to and out of mechanical engineering. Dr. Nye manages the spring accepted student open houses, RIT First Look, and transfer student open house. Dr. Nye regularly meets with prospective students who are considering RIT as their destination for study. Dr. Nye oversees the co-operative education program and must approve any co-op opportunity not listed through job-zone. Dr. Nye is in charge of the study abroad program in mechanical engineering, and can help you with any question you may have about studying at our RIT Dubai

campus, or another location. Dr. Nye manages the AP articulation, Project Lead the Way, International Baccalaureate, and transfer credit evaluation for incoming freshman.

Risa Robinson is the Associate Department Head for undergraduate education. She manages the core undergraduate course offerings in mechanical engineering and also serves as the coordinator for the Engineering Science Core Curriculum. Dr. Robinson is responsible for all outcomes assessment and accreditation issues in the department. Dr. Robinson manages the fall prospective student open houses.

Diedra Livingston is the Mechanical Engineering Student Services Coordinator. She oversees first and second year programs for the Mechanical Engineering Department and works closely with faculty advisors to help student stay on track for the completion of their degree. Diedra work closely with Diane Selleck, the ME Student Information Specialist. Sherill Anderson is a staff advisor in the ME department. Diane maintains graduate and undergraduate student records and is responsible for data entry related to registration. Between Diedra, Diane, Sherill and your faculty advisor, you should be able to find an answer to almost any degree completion question that you may have. Diedra coordinates the Mechanical Engineering Learning Communities and registration and advising for first and second-year students.

Venessa Mitchell is the Mechanical Engineering Administrative Financial Service Coordinator. She maintains the financial records for the mechanical engineering department. She provides departmental budget information and tracks all students employed in our department. Venessa works with all faculty members who hire students for their classes and labs, all purchasing related to student clubs, and purchasing related to research projects. If you have a question about anything financial, Venessa is your point of contact.

David Hathaway the Mechanical Engineering Operations Manager, assisted by Rob Kraynik and Jan Maneti is responsible for maintenance and repair of the equipment in all of our labs. Dave supervises the student technicians who work in the Machine Shop and PC Lab and he is responsible for all use of the machines in the shop area. Before any project work is done in the Machine Shop, please see Dave. Dave, Rob, and Jan teach materials processing labs and will work with you on prototypes and fabrication throughout your academic careers.

William Finch is the Systems Administrator for the Department. He is in charge of the ME computer labs, their maintenance and upkeep. Bill also is the supervisor for the lab assistants who work in the computer labs.

Every mechanical engineering student has a mail folder outside the Mechanical Engineering Office. Any messages for you will be placed in your mail folder. Memos from the Co-op Office, Mechanical Engineering Office, Dean's Office, instructors, and general information regarding the program will be put into your mail folder. Faculty members may hand papers back to your mail folders. Important notices and information will be posted above the mail folders. YOU SHOULD CHECK YOUR MAIL FOLDER REGULARLY IN ORDER TO RECEIVE INFORMATION IN A TIMELY MANNER.

All faculty members have their own mailboxes, and the ME office staff will deliver information from you to the faculty mailboxes. If you have any messages for your faculty member, want to submit late homework assignments, etc., please hand submit them to the front desk in the Mechanical Engineering office and have it date stamped, *unless instructed otherwise by your professor*. Make sure that the instructors' name and your name are clearly visible so that your paperwork is filed in the correct mailbox.

MECHANICAL ENGINEERING FACULTY AND STAFF DIRECTORY

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