Elisa Toulson with MSU’s rapid compression machine, which is to measure the ignition delay of fuels for chemical kinetics studies at engine relevant pressure and temperature conditions. Read about her research on page 8.
Teaching Award Nomination Form:

ME 491/001—Intro to Computational Fluid Dynamics (3 credits) will be offered Spring 2012 as a non-design intensive Senior Elective. It will taught along with graduate students who will take the course as ME 840, and who will have different assignments. For more information, see page 15.

ME 491/602—Intro to Cryogenic Engineering (3 credits) will be offered Spring 2012 as a design intensive Senior Elective. For more information, see page 15.

ME 491/603—International Development (3 credits) will be offered Spring 2012 as a non-design intensive Senior Elective. For more information, see Dr. Thompson’s article on page 10.

Class Standing. ME juniors and seniors can obtain this information in 2560 EB. Sophomores should go to 1410 EB. Be prepared to show your MSU I.D.

Job Search Advice: Jennifer Jennings from Career Services & Placement is available to answer questions about your job search. To schedule an appointment with her, go to 1340 EB, or go to: http://careernetwork.msu.edu/students/advising.

Prerequisites: The Department expects all students, including members of the Honors College, to observe all course prerequisite requirements. If you have a question about prerequisites, contact the ME Advising Office.

Curriculum News

Summer 2012 Courses: ME 222, 332, 451, and 461 will not be offered next summer. If you need help with your schedule, please make an appointment with Gaile (see procedure at left).

Co-op Students: Before you leave for your Spring 2012 co-op rotation, please be sure to discuss your schedule for next Fall 2012 / Spring 2013 with your academic advisor.

ME 481–ME Design Projects requires department approval before you can enroll, and you must take this course during your last semester (or spring for August graduates). To obtain approval, schedule an appointment with Gaile to finalize your long-term schedule. Call 355-3338 or stop by 2560 EB to make an appointment.

ME 489–Technical Communications (2 credits) is on the spring schedule. Instructor: Craig Gunn, ME Director of Communications. IMPORTANT: This course is an Other Elective. It is not a Senior Elective.

ME 464–Intermediate Dynamics (3 credits) will be taught during Spring 2012 along with graduate students who will take the course as ME 861, and who will have different assignments. For more information, see Dr. Shaw’s article on page 6.

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ME Bulletin

The ME Bulletin is published twice a year (fall & spring) for sophomores, juniors, seniors, faculty, and staff of the Department of Mechanical Engineering. Photographs were taken by Craig Gunn unless noted otherwise.

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Department News

• Dr. Rodney Tabaczynski has joined the ME faculty as a full professor. He received his Ph.D. from MIT in 1971. Dr. Tabaczynski is a world authority on engines, engine modeling and engine system performance. He was director of Ford Powertrain and Vehicle Research Laboratory and a Ford Technical Fellow until his retirement. In 2002 he was elected to the National Academy of Engineering, the most prestigious recognition offered to engineering leaders in the US. He will be playing an active role in the development of research programs in both the Mechanical Engineering Department and the College of Engineering.

• Dr. Elisa Toulson has joined the ME faculty as an assistant professor. Dr. Toulson received her Ph.D. in 2008 from the University of Melbourne in Australia. Most recently, she has been a post-doctoral research associate in the MSU Energy and Automotive Research Lab. Next semester she will be teaching ME 201.

• Dr. Nicholas Gianaris has been appointed director of the Composite Vehicle Research Center (CVRC). Dr. Gianaris received both his Ph.D. (1996) and M.D. (1992) degrees from Johns Hopkins University. Most recently he was a senior engineering specialist for Advance Structures Development at General Dynamics Land Systems (GDLS). GDLS specializes in armored vehicles for the U.S. Army and Marine Corps. He is recognized for pioneering work in various areas of materials design, characterizations, and processing.

• Professor John Foss was awarded the 2011 ASME Fluids Engineering Award for the sustained advancement of flow measurement, diagnostic methods, and fluid mechanics-based inventions and applications in the automotive and aerospace fields, underpinned by fundamental research in shear flows and co-authored and handbook publications. The guiding spirit for his research has been “analytical experimentation” in which one seeks to identify and to utilize the basic phenomena of the subject flow field. This spirit is present in his 82 journal and conference publications, his 13 book chapters, and his co-authored textbook. The direct measurement of time resolved vorticity and using these data to infer governing phenomena is a particular example of this spirit.

• Professor Steven Shaw has been named a University Distinguished Professor in recognition of his achievements in the classroom, laboratory and community. This is among the highest honors that can be bestowed on a faculty member by the university. Those selected for the title have been recognized nationally and internationally for the importance of their teaching, research and outreach achievements. Individuals holding the professorship receive, in addition to their salary, a stipend of $5,000 per year for five years to support their professional activities.

• Professor Tongyun Lee has been promoted to associate professor with tenure. Recently, he has also received several awards, including an Office of Naval Research Young Investigator Award, an MSU 2011 Teacher-Scholar Award, and a Presidential Early Career Award for Scientists and Engineers. The last award is “the highest honor bestowed by the United States government on science and engineering professionals in the early stages of their independent research careers for pioneering work in the development of advanced multispectral high-speed laser imaging techniques for combustion diagnostics in next-generation hypersonic propulsion systems, and for his leadership and enthusiasm in promoting science and engineering education to a new generation of students.”

• Dr. Scott Kiefer has accepted a faculty position with York College in Pennsylvania. He received the 2011 Withrow Senior Distinguished Faculty Award. Read more about his award on page 5.

• Professor Ranjan Mukherjee was presented with the 2011 Withrow Senior Distinguished Faculty Award. Read more about his award on page 5.

• Professor Steven Shaw has been appointed as faculty advisor for the MSU Mini-Baja team.

NEW! Open Seat Notifications – Schedule of Courses

The Registrar has announced a new feature available in the Schedule of Courses. If a student adds a course section to his/her planner and (1) the course section is full and (2) it is during an enrollment appointment time period for the student, the student can request an “alert” for an open seat. The alert may be sent to the student’s MSU email account or to a cell phone via text messaging. Upon receiving the alert, the student may attempt to enroll in the course using the Schedule Builder system in Schedule of Courses.
Prerequisite courses contain the foundation material that is needed to succeed in the current course. Having this background is important for the student to have the best chance of understanding the new material being covered in the current class. It is additionally important for courses with laboratory and design groups so that each teammate is prepared to contribute to the final report, experiment, or design. Even in a lecture class, each student must be prepared as possible so that he or she can ask the best questions possible and, where active learning is employed, that students are contributing to their peers’ education.

The curriculum has been developed as a whole. Courses are built on one another, to reinforce and extend concepts. ABET accredits our program based on the curriculum in totum. Therefore, the students and faculty must do our best to follow it. That said, the prerequisites are sometimes changed. This is a deliberative process, which usually starts with the faculty who teach the course, then the undergraduate curriculum committee, and finally the faculty as a whole considers it. Following this change of events, the steps are documented and during the next ABET visit it is presented and defended.

There are some conflicting regulations about prerequisites. Students in the Honors College and athletes can register for classes a bit earlier than other students. Mechanical Engineering holds them to the same prerequisites, however, for the reasons cited above.

Are prerequisites some times inconvenient? Yes. Maybe there is a co-op opportunity or an internship that makes for a conflict. Conflicting desires, wants, and “needs” are part of the “real world” that everyone talks about. (Ever notice that the real world is always somewhere else?)

The best way to avoid prerequisites from presenting an impediment is to talk with Ms. Gaile Griffoe early in your studies. A good plan and diligent study will help you to move through the curriculum as smoothly as possible.

Good luck and best wishes for the rest of the semester.

For Juniors: Reduce the Time to Get Your MS Using The Linked BS-MS Program!

By Professor André Bénard, ME Graduate Advisor

If you are at the junior or senior levels and interested in graduate school, it’s time to consider using the Linked BS-MS option. You can apply for the Linked BS-MS program in order to use up to 9 credits of qualifying 400-level (and above) classes to count toward the credit requirement of the master’s degree. This effectively reduces the duration of a master’s degree by up to one semester (or more sometimes). It is important to apply as soon as possible to allow flexibility in scheduling three courses during your senior year. This can be combined with a summer internship in a lab to get a head start on your research.

Applying for the Linked BS-MS program will not cost you anything and is not a commitment to attend graduate school, but it is important to apply early as you cannot select the courses retroactively. For more information about the Linked Bachelor’s-Master’s program on MSU’s website, go to: http://www.reg.msu.edu/ROInfo/GradHonor/DeansList.aspx.

Dean’s List

Congratulations to these 189 ME majors who made the Dean’s List after Spring and Summer 2011. To be on the Dean’s List, you must have a semester GPA of 3.5 or better. This list is from September 16. For updates, go to: http://www.reg.msu.edu/ROInfo/GradHonor/DeansList.aspx.


Dr. Scott Kiefer received the 2011 Withrow Teaching Excellence Award last spring at a special awards luncheon and ceremony. He was presented with an inscribed plaque, a medallion to wear at commencement ceremonies, and a small stipend. Each year a committee consisting of the last three faculty award winners, plus student representatives from ASME, SAE, and Pi Tau Sigma, makes the selection after reviewing nominations from ME juniors and seniors.

Dr. Kiefer joined ME department in 2009 as a teaching specialist, and for the last two years he taught a variety of courses, including ME 222, 361, 451, 461, and 471. He had previously taught at Tri-State University, the University of Puerto Rico at Mayaguez, and North Carolina University. Last spring Dr. Kiefer accepted a new position at York College of Pennsylvania.

Dr. Kiefer is an exemplary teacher who always went the distance for his students. He had the ability to present material in a way that was understandable to his students, clearly expressing his desire to facilitate their learning. One student said, “Dr. Kiefer has taught three of the courses I have taken in ME and they were the best I have had at MSU.” Another said, “Dr. Kiefer is the best instructor the college has. His dedication, patience, and ability are unrivaled.” Contact with his students was not limited to his courses. As one student stated, “Dr. Kiefer has willingly offered his assistance on my work when I was not even in his

Dr. Mukherjee has made significant theoretical and experimental contributions to the design of a broad range of systems including space and mobile robotic systems, medical telerobotic systems for surgery and diagnosis, nonholonomic systems, rotor systems with magnetic bearings, and flexible structures. His research captures the imagination of experts and novices alike by producing elegant, modern solutions to classical engineering problems.

His early work in the 1990s using the Stokes theorem for motion planning in space robots is a basis for recent work at Carnegie Mellon in the development of generic algorithms for producing kinematic, dynamic, and kinodynamic gaits in robots. As a result, decades of research dealing with motion planning ranging from snake-boards to mobile robots have been united. His solution for the stabilization problem of the rolling sphere led to the design of a unique spherical robot platform that attracted worldwide attention in the popular press. His designs of haptic devices for remote medical diagnostics led the field and have also been covered widely in the scientific and popular press.

Dr. Mukherjee has been awarded several U.S. patents—evidence of the novelty of his work. He was recently named a fellow of the American Society of Mechanical Engineers based on his distinguished scholarship in the fields of robotics and control and is a recent recipient of a Fulbright Scholarship to pursue robotics research in Japan. The National Science Foundation has also supported his efforts to carry out collaborative research on humanoid robotics with researchers in Japan. He is well placed to continue his pioneering work in robotics, in particular, in areas like surgical robotics, where there is considerable interest from agencies like NIH.
Teaching Award Nomination Form:

59 Seniors to Graduate in December!

Congratulations to all mechanical engineering December graduates! On behalf of the ME faculty, I wish you the greatest happiness and success in your careers, graduate studies, and personal lives. The following students had applied for graduation by October 13. If your name is missing, please contact me immediately (Email Gaile at griffore@egr.msu.edu- Tele: 517-355-3338).

Dr. Shaw, our faculty advisor, has been a great contributor to our activities. We would also like to thank the people who have made our club possible. Dr. Shaw, our faculty advisor, has been a great contributor to our activities. We would also like to thank the generous sponsors, Dow Chemical and BP.

It is easy and beneficial to become a member. With job placement becoming more of an issue every day, joining a student group gives you a competitive edge. To sign up, please contact our president, Adam Sajdak, at saidakad@msu.edu or go to www.asme.org, click “membership,” and then click “join.” The cost is only $25 per year, and free for freshmen.

Submitted by Adam Sajdak, President.

IAH/ISS Diversity Requirement

Many courses in the Arts and Humanities area and in the Social, Behavioral, and Economic Sciences area, emphasize national diversity (designated “N” at the end of the course title), or international and multicultural diversity (designated “I” at the end of the course title). Some emphasize both national diversity, and international and multicultural diversity (designated “D” at the end of the course title).

Students must include at least one “N” course and one “I” course in their Integrative Studies programs. A “D” course may meet either an “N” or an “I” requirement, but not both.

ME 464 & 861 Combine by Professor Shaw

For Spring 2012 ME 464-Intermediate Dynamics and ME 861-Advanced Dynamics will be taught in a combined lecture section. The general subjects covered in the two courses are largely the same, with the graduate course having a few more advanced topics, more challenging homework assignments and exams, and a different textbook. For this combined class some additional lecture time will be given for the advanced material for the graduate students, and the two classes will be given separate homework assignments and exams. So, other than the presence of graduate students in the classroom, the ME 464 students will have virtually the same experience as previous ME 464 classes. If you have questions about ME 464, contact Professor Steve Shaw (shawsw@egr.msu.edu).
Your Career Services Network at Michigan State is prepared to help you! The Department of Labor estimates that up to 80% of positions are filled without employer advertising! If you are relying on job postings as your primary job search strategy, you’re only seeing approximately 20% of what’s out there.

We’ve given you methods and tools for finding professionals working in your fields of interest. What are you doing right now to create or establish those important professional relationships?

Meeting people gives you an opportunity to learn from them. If you are not sure what career path you would like to pursue, talk with many different professionals... they can help you narrow your areas of interest. Remember, networking should begin long before your job search. You don’t even realize that you are doing it!

Networking is usually not a formalized process, it is an informal discussion with people you already know, or have just met. In fact, most students use networking all the time without even realizing it. When scheduling classes, have you ever asked a friend or classmate about their experiences, or to recommend a good class or section? When making a (relatively) large purchase such as a new cell phone, athletic shoes, computer, or even a car, have you asked people you know what they’ve liked or disliked about theirs? Have you posted questions (or answers) to online boards discussing these kinds of topics? Guess what—that's networking!

Since networking can happen anywhere, be prepared to introduce yourself and deliver your pitch about who you are and what you want to do. For some students, this often happens at their part-time job in conversations with customers and clients.

“...be aware that employers are very likely to look you up on Facebook or Google you before you even come in for an interview. What are you studying? What do you want to do after graduation?” You never know when that conversation can lead to a new contact or even an invitation to pass along your résumé!

Understand the fast-changing world of social media and its importance in your career development. Certainly you have used on-line sites to connect with others in order to share ideas or information! Two popular social media sites are Facebook and YouTube; however, there are many other tools that you may choose to use in obtaining or sharing information that can help you develop your career.

LinkedIn. Over 70 million professionals use LinkedIn to exchange information, ideas, and opportunities. See http://learn.linkedin.com/students for information specifically geared toward student users. Learn how to effectively build your profile; connect with contacts, and find opportunities. (Tip: Search for and join groups based on interests and affinities. Being members of a common group expands your network and gives you more professionals to connect with.)

Plaxo: A smart, socially connected address book. Tracks feeds from Twitter, Facebook, and dozens of other sites.

Twitter: Stay updated with professionals or employers and keep others up to date with this instant information tool. Use Twitter directories like WeFollow.com and Twellow.com to find professionals and organizations related to your interests that you may want to follow. Some organizations have Twitter accounts dedicated to job postings.

Facebook: Yes, employers and professionals are on Facebook too. Even if you don’t choose to add professional contacts as friends, be aware that employers (and your future colleagues) are very likely to look you up on Facebook or Google you before you even come in for an interview. If you like the idea of using Facebook for both personal and professional reasons, search pages and groups for field or employer specific info or communities. Also consider using your status updates strategically to help your network of friends help you.

The use of social media in learning about potential career paths, receiving feedback on job search documents (e.g., résumés), connecting with alumni, and networking with professionals in your field of interest is becoming one of the most important avenues for a new generation of successful job seekers.

For more information on this story or others like it visit www.caareernetwork.msu.edu and view the Career Passport (or pick up a copy in the Center/1340 EB).
Renewable Fuels Combustion Research by Professor Elisa Toulson

The world is currently dependent on burning non-sustainable fossil fuels to meet its energy needs. Combusting these fuels releases large amounts of greenhouse gases and other pollutants that are affecting our climate and atmosphere. The future will require both improved fuel efficiency and the incorporation of renewable fuels in order to meet energy production and transportation needs. Enhanced ignition technologies may provide one way forward to meeting future emission standards and fuel economy requirements. Additionally, studying the chemical kinetics of the combustion and after-treatment processes can lead to the development of cleaner and more efficient systems.

Elisa Toulson, Assistant Professor of Mechanical Engineering, is researching combustion, with a focus on enhanced ignition technologies that can improve fuel consumption, reduce emissions, and improve combustion stability in internal combustion engines. These technologies may also enable renewable fuels and fuel blends to be integrated with existing technologies, facilitating their introduction into the marketplace. Currently, the mechanism by which these technologies enhance ignition and combustion is not fully understood. A better understanding of the enhancement mechanism may be gained through both optical diagnostics of the combustion process as well as CFD simulation using detailed chemical kinetics.

Chemical kinetics modeling is another important aspect of renewable fuel combustion research that Toulson is researching. Alternative fuels such as biodiesel are presently receiving attention as potential substitutes for...
fossil fuels, as they can be renewable, carbon neutral and provide energy security. However, renewable fuels such as biodiesel can be blended from many different components and therefore the availability of the detailed chemical kinetic mechanisms required to model their combustion is limited. Furthermore, biodiesel has complicated oxidation chemistry due to the large size of the molecules that make up the fuel. The complicated chemistry makes these fuels difficult to directly model and existing models are very large, making them computationally expensive. Reduced chemical kinetic models of biofuels are one way forward in enabling simulation of renewable fuel combustion. This type of modeling in conjunction with experimental research allows for an improved understanding of the combustion of new renewable fuels.

Exhaust after-treatment technologies for both gasoline and diesel combustion systems is another area of interest for Toulson. Development of increasingly efficient exhaust after-treatment technologies is required to meet mandated emission standards. In order to meet current standards, engines are often run at non-optimal operating points. The three-way catalyst used with gasoline engines requires the engine to be operated at stoichiometric conditions, although lean burn technologies are more fuel efficient. Development of after-treatment technologies that are capable of reducing and oxidizing engine-out emissions at more fuel efficient operating points would enable a reduction in both fuel consumption and greenhouse gas emissions. The design and development of after-treatment technologies can be further enhanced through CFD simulation using chemical kinetics to model the surface chemistry that occurs between the exhaust gases and the different catalysts and particulate filters in the after-treatment systems.

Perceptions about Communication from the Past
by Craig Gunn, Director of Communications

To be very honest I wrote the following words almost 10 years ago in a previous ME Bulletin. One could say that I am simply copying, but on the other hand, I really feel that we need to get back to earlier times and words that still have meaning in the lives of engineers.

Probably one of the last things that you might think about when it comes to communication in the engineering world is the issue of dealing with the people with whom you come in contact. Now, I am not talking about those communication skills that you have been developing within:

How do you present yourself as an engineer and what do people say about you when you turn your back?

your 16 or so years of formal education: the written and spoken language that you have hopefully cultivated over those years. I am talking about those cultural nuances that will set you apart from your colleagues from other institutions, who perhaps believe as Americans did in the distant past, that when someone didn’t understand their words, they simply talked louder. Those people learned all the words and knew how to shout them and write them, but they failed to understand that communication is a whole lot more than just words uttered out loud or scratched on a paper. Communication involves a belief in people and their worth and cultivating language to both inform and respect those to whom you must report and oversee.

As you begin to look forward to those days not far away where you will no longer be in the classroom listening to and repeating information that is presented to you, start to evaluate how you communicate to others beyond the words that you use. Take a good evaluative look at how you normally communicate to people in the real world and in the classroom.

How do you treat the waiter and waitress who have to contend with a room full of inebriated college students? How do you react to someone whom you think has a job not equal to yours? What methods do you use to try to ingratiate yourself to people who may be important to your career ladder climbing? How do you tell friends that they must step aside in order to make way for others who may be more important in your career path? How do you present yourself as an engineer and what do people say about you when you turn your back?

Communication has never been just about words. Communication is life itself. It is the technical knowledge that you think about and speak. It is the education that you have gained in the classroom and in the workplace. Communication allows you to speak within yourself about the world and all those things important to you. It grants you the avenue upon which to spread your ideas and beliefs to others. It lives with you from the moment of your birth until the last breaths you take. But truly good communication moves to a higher plane, transcends the common words of existence, and epitomizes a belief that we live in a society where all people make a difference. You as an engineer will make a difference in the world of tomorrow, but that difference can be even greater if you consider how your words and thoughts affect all those individuals around you.
Consider that you – in the not too distant future – are in discussion with a company recruiter or a graduate admissions officer. When the question is posed, like that in the Bible: “What do you more than others?” the following can provide a powerful answer. “I carried out an independent research project at the RWTH-Aachen and studied their language in an environment with many opportunities to practice what I was learning.”

In addition to this future benefit, you can also (if accepted) enjoy the near term benefits of establishing a close working relationship with an ME (at MSU) professor (important for future letters of reference), live in a capital city of Charlemagne (from 800 AD), take advantage of European travel (3-day weekends) and establish long-term friendships with your MSU and your RWTH colleagues from the summer in Aachen.

An informational meeting, with students from the 2011 summer experience will be held soon after this article is made available in the ME Bulletin. If you are interested in the 2012 Program, you are encouraged to contact BOTH Gaile Griffore (griffore@egr.msu.edu) and Prof. J. Foss (foss@egr.msu.edu) 355-3337) asap to ensure your awareness of this meeting. We will form the 2012 group this fall such that the student interests in their 1-credit spring and their 5-credit summer 490 experiences best fit their interests. Student interest in later (2013, 2014) programs is also welcome.

A generous endowment by the North American Rockwell Corp. has made substantial scholarship funds available for the MSU/ME students. This corporate gift to MSU emphasizes the importance that multinational companies place on an in-depth international experience for their engineering workforce.

ME491-Section 603: International Development (Spring 2012) by Dr. Brian Thompson

There is a smoldering international conundrum that has recently been transformed into an inferno by predictions that the world population will increase by 50 percent before 2050. How will planet Earth sustain all these hungry people? How can we ensure international peace, equality and justice, as people in this statistical deluge in the population struggle to survive despite the inevitable poverty, trauma and absence of life’s essential ingredients? . . . potable water, food, sanitation, clean air, shelter, and health?

The fabric of this design-intensive ME 491 course will weave a thread of ideas on humanitarian societal development in third-world countries with a second thread of fundamental ideas on the engineering design process relevant to all nations. This warp and weft of intertwined fibers constitutes the biggest challenge confronting humanity today, and it’s of paramount importance that engineers provide leadership at the vanguard of this societal struggle for survival.

This project-based course will require student teams to embark upon authentic product development projects in the complex inter-disciplinary cauldron called the developing world that is found in Africa, Asia, and the Americas. Design-build-test-refine will be the mantra. Experts from all over the campus ranging from horticulture to medicine will reinforce this core pedagogical structure with a suite of guest lectures. Further buttressing of engineering concepts will be provided by considering the fundamentals of creative problem solving, decision theory, psychological impediments to creativity, and the numerous multicultural issues associated with diffusing innovations through organizations both here in the United States and also in less developed parts of the world. So! Are your shoulders stout enough to carry forth this burden?

For more information about this exciting study abroad program, contact Gaile Griffore, ME Advisor, 2560 EB, 517-355-3338 (griffore@egr.msu.edu)

Study Abroad at the University of Edinburgh by Gaile Griffore & Craig Somerton

Consider spending a fall or spring semester (or maybe an entire year) studying abroad at the University of Edinburgh in Scotland!

Founded in 1582 the University of Edinburgh is one of Europe’s finest universities with a great tradition of producing outstanding scholars, including such giants as Charles Darwin and Sir Arthur Conan Doyle. In engineering, there is William John Macquorn Rankine, who proposed both the Rankine cycle (primary in the operation of steam power plants) and the Rankine temperature scale (the absolute scale used in English units).

The mechanical engineering facilities are very modern, allowing the faculty and students to pursue research topics varying from wave energy to micro-fabrication.

The city of Edinburgh, whose downtown is a short bus ride from the university’s engineering buildings, is listed as a World Heritage Site. In addition, for students seeking leisure activities the city has a terrific night life with many activities for young adults.

You will be able to take courses that fulfill your entire Senior Elective requirement (i.e., 12 credits of Senior Electives, including the 3-credit design intensive course). Or, you may be able to take a variety of courses that approximate what you would have been taking at MSU.

For more information about this exciting study abroad program, contact Gaile Griffore, ME Advisor, 2560 EB, 517-355-3338 (griffore@egr.msu.edu)

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world. So! Are your shoulders stout enough to carry forth this burden?

For more information, please contact Professor Thompson at thompson@egr.msu.edu
Study Abroad in Lyon, France (ECAM) by Professor André Bénard

The Department of Mechanical Engineering offers a five to six week study abroad program for ME junior-level students in Lyon, France each summer. The students stay at ECAM, a French engineering school located in the old part of Lyon. Students are required to enroll for a minimum of 3 credits and can obtain credits for ME 201, ME 410 or ME 416 (the classes are taught in English and will require a minimum number of students to be held). Students will also take a French language course (taught in French). If you are interested in this program, please contact: Ms. Maggie Blair-Ramsey (blairram@egr.msu.edu) or Professor André Bénard (benard@egr.msu.edu).

Pi Tau Sigma

The Tau Epsilon chapter of Pi Tau Sigma has had a busy start to the semester. We began with our traditional “Wing Night” at Buffalo Wild Wings. We all enjoyed all-you-can eat wings and had a good time socializing with each other. All eligible members were invited to join us and learn more about our organization. This semester there are 12 candidates for initiation. Next, we volunteered to help out with the Ronald McDonald House, and our members enjoyed helping out the community.

Currently, we are collaborating with ASME to plan a design challenge for later this semester. In November we will meet for dinner at Crunchy’s. We started this event last year and hope to continue it as a fun tradition.

Lastly, we will hold initiation in November to induct new members into our chapter. For more information on Pi Tau Sigma or any of our events, please visit www.egr.msu.edu/pts. Submitted by Peter Koenigsknecht, President.

Solar Car

This past May the Michigan State Solar Car Racing Team competed for the first time in the Formula Sun Grand Prix, completed 207 laps, and tied for 7th place. The team plans to build on this momentum and race in the American Solar Challenge for the first time in MSU history next summer. This requires plenty of dedication from the current team members to update the car, Brasidius. We will be updating its frame, suspension, body, and electrical systems.

The frame re-design will involve modifying the roll-cage to improve safety, aerodynamics, and weight distribution. The suspension work includes reducing weight and tire scrub. Lastly, the team anticipates building a new body with wheel fairings to significantly improve the car’s aerodynamics. All areas of major development will occur during both fall and spring semesters.

The Michigan State Solar Car Racing Team provides a great opportunity for students to improve their engineering skills. The team looks forward to racing this summer and developing an even stronger student organization within the university. Submitted by Josh DeWalt, Chief Mechanical Engineer.

PHOTO PROVIDED BY JOSH DEWALT

Solar Car Team: Hasan Alali, James Miller, Manila Ounsombath, Lindsay Karnlin, and Kyle Urban. The photo was taken at MSU solar team at the Formula Sun Grand Prix.
The Michigan State Baja Team is gearing up for another exciting season. Successful fall recruiting has lead to an influx of members excited to begin building this year’s car. The new car will feature our proven chassis and suspension tuning while employing a hybrid transmission system. After making friends at the final competition last season in Peoria, Illinois, the team is looking forward to a drive day with the University of Michigan Baja Team in late October at our proving grounds off College Road. The team is also preparing for The Blizzard Baja Race in Houghton where they placed 3rd last season. All three SAE sponsored competitions in Alabama, Oregon and Wisconsin are on the team’s calendar for next summer.

There are still plenty of opportunities to join whether you want to design, fabricate, or just make some new friends. If you are interested in joining contact the project manager Katie Worley or the chief engineer Nick Kuuttila at michiganstatebaja@gmail.com about coming out to the shop. Submitted by Nick Kuuttila, Chief Engineer.

The Michigan State Formula Racing Team’s 2011-12 race season is well under way as the design phase has been completed. The team has moved out of the Engineering Building and into our shop out on Jolly Road. We have ambitious goals as we transition back to a full carbon fiber monocoque chassis and contemplate implementing a full aerodynamics package. This upcoming year the team plans to attend two major competitions. The first competition, FSAE East, is held annually at Michigan International Speedway. The second and newest competition, Formula Student Germany, is held in Hockenheim, Germany and marks the first time the team will ever compete in an international competition.

The Michigan State Formula Racing team competed at the Goodyear Shootout Invitational on September 17th in a field of 9 competitive teams, placing third overall. We brought home a new set of tires courtesy of the hard work of all team members and of drivers Scott Smith and Chris Archambo.

If you are interested in joining the team, please contact Brady Thom at thombrad@msu.edu. Submitted by Brady Thom, Project Manager.

Undergraduate Program Educational Objectives
Department of Mechanical Engineering
Michigan State University
(Approved by the ME Department Faculty on February 17, 2005)

Objective 1: Our graduates will be competent engineers practicing in a diverse range of activities.

Objective 2: Our graduates will use their mechanical engineering education as an impetus for personal & professional growth.

Objective 3: Our graduates will have achieved a noteworthy level of workplace responsibility through understanding their environment and capabilities, including the importance of knowledge management.

Objective 4: Our graduates will be independent thinkers who take ownership in identifying problems and determining effective solution strategies in a timely manner.
Michigan State University
Department of Mechanical Engineering
Concentrations and Emphasis Areas

The Department of Mechanical Engineering offers four official concentrations: Biomedical Engineering, Engineering Mechanics, Global Engineering, and Manufacturing Engineering. Completion of a Concentration is recorded on the final transcript.

However, some students would like to focus their senior elective choices on an area that does not have an official concentration associated with it. Three areas that are mentioned frequently are aerospace, automotive, and energy. Each of the following groups of senior electives focuses on one of these three interest areas. Although the completion of one of these groups will not be recorded on the final transcript, it will serve to indicate a student’s interest in pursuing a career in a specific industrial sector.

**Aerospace Engineering**
- ME 422 Introduction to Combustion
- ME 440 Aerospace Engineering Fundamentals
- ME 442 Turbomachinery
- ME 475 Computer Aided Design of Structures

**Automotive Engineering**
- ME 422 Introduction to Combustion
- ME 442 Turbomachinery
- ME 444 Automotive Engines
- ME 445 Automotive Powertrain Design

**Energy Engineering**
- ME 416 Computer Assisted Design of Thermal Systems
- ME 417 Design of Alternative Energy Systems
- ME 422 Introduction to Combustion
- ME 442 Turbomachinery

For more information, contact the ME Advising Office, 2560 Engineering Bldg., 517-355-3338.

Acknowledgement: Many thanks to Dr. Somerton for his help in identifying these emphasis areas and a list of courses for each one!
Department of Mechanical Engineering

Teaching Award Nomination Form:

ME 132 - 3 Calc I
EGR 100 - 2 Intro Engr Desgn
CEM 141 - 4 Gen Cem
CEM 161 - 1 Cem Lab I

ISS 2XX - 4 1st Int Soc Sci
MTH 133 - 4 Calc II
EGR 102 - 2 Intro Engr Model

WRA XXX - 4 Univ Writing
MTH 234 - 4 Multivar Calc
PHY 183 - 4 Physics I
CE 221 - 3 Statics

MTH 235 - 3 Diff Equations
PHY 184 - 4 Physics II
ME 280 - 2 Graphic Comm
ME 222 - 4 Mech of Defrm Sol

ME 391 - 3 Mech Engr Analy
IAH 20X - 4 1st Int Arts & Hum

MTH 332 - 4 Fluid Mechanics
ECE 345 - 3 Elect Instr & Syst
ME 331 - 4 Heat Transfer
ME 471 - 4 Mechanical Des I
ME 461 - 4 Mechan Vibrations
ME 471 - 3 Mechanical Des II
ME 451 - 4 Control Systems
ME 461 - 4 Control Systems

ME 361 - 3 Thermodynamics
ME 371 - 3 Mechanical Des I
ME 371 - 4 Mechanical Des II
ME 410 - 3 Heat Transfer Lab
ME 410 - 4 Heat Transfer Lab
ME 410 - 4 Heat Transfer Lab
ME 410 - 4 Heat Transfer Lab

ME 201 - 3 Thermodynamics
ME 201 - 3 Thermodynamics
ME 201 - 3 Thermodynamics
ME 201 - 3 Thermodynamics

ME 481 - 3 ME Desgn Projects
ME 461 - 4 Mechan Vibrations
ME 471 - 3 Mechanical Des II
ME 451 - 4 Control Systems

ME 412 - 2 Heat Transfer Lab
ME 412 - 2 Heat Transfer Lab
ME 412 - 2 Heat Transfer Lab
ME 412 - 2 Heat Transfer Lab

Term 1 Term 2 Term 3 Term 4 Term 5 Term 6 Term 7 Term 8
Spring Freshman Year
Fall Sophomore Year
Spring Junior Year
Fall Senior Year

These requirements are effective for students admitted to the Mechanical Engineering major beginning Fall 2010.

Michigan State University | College of Engineering | Engineering Undergraduate Studies

http://www.engr.msu.edu/undergraduate/academicprograms
SPRING SEMESTER SENIOR ELECTIVES

- The asterisk (*) after a course number indicates that it has been officially designated as “Design Intensive.”


**ME 442** Turbomachinery. 3(3-0). Prereq: ME 332. Engeda.

**ME 445** Automotive Powertrain Design. 3(3-0). Prereq: ME 444. Schock.

**ME 464** Intermediate Dynamics. 3(3-0). Prereq: ME 361. Shaw.

**ME 475** Computer Aided Design of Structures. 3(2-3). Prereq: ME 471 or concurrently. Averill.

**ME 477** Manufacturing Processes. 3(3-0). Prereq: ME 222 and MSE 250, and Tier I Writing. Thompson.

**ME 478** Product Development. 3(3-0). Prereq: ME 477 and Tier I Writing. Kwon.

**ME 490** Independent Study. 1-4 credits. Requires Override—See #1 Below. You may re-enroll for a maximum of 6 credits.

**ME 491** Selected Topics in Mechanical Engineering. Section 001: Intro to Computational Fluid Dynamics. Requires Override—See #2 Below. Course Description: Theory and application of finite difference and finite volume methods to selected fluid mechanics and heat transfer models including a potential flow model, a compressible flow model and an incompressible Navier-Stokes model. Prereq: ME 410. Jaberi

**ME 491** Selected Topics in Mechanical Engineering. Section 602: Intro to Cryogenic Engineering. Requires Override—See #2 Below. Course Description: Cryogenics is the science and engineering of phenomena that occur at a temperature below 120 K. The class will emphasize the engineering aspects of cryogenics including: cryogenic properties of materials, air separation, refrigeration, liquefaction, cryostat design, cryocoolers, two-phase flow, instrumentation, cryogenic safety and the properties of cryogenic fluids. Prereq: ME 410 or concurrently. Weisend.

**ME 491** Selected Topics in Mechanical Engineering. Section 603: International Development: Dialogue; Discovery; Design; Development; Dissemination. Requires Override—See #2 Below. Course Description: Case studies, lectures, group mini-projects, and a major project, in which students will apply design methodologies to create and manufacture a sustainable solution to an engineering problem as might be sited in a developing nation such as India, Peru, or Tanzania. Prereq: ME 410 and ME 471. Thompson.

**ME 495** Tissue Mechanics. 3(3-0). Prereq: ME 222. Biomechanical Concentration Course. Haut.

**ME 497** Biomechanical Design. 3(3-0). Prereq: None for ME majors. Biomechanical Concentration Course. Reid-Bush.

**BE 445** Biosensors for Medical Diagnostics. 3(3-0). Prereqs: BS 111 or 161 and CEM 141 and ECE 345. Biomechanical Concentration Course. Alocilia.

**CE 422** Applied Hydraulics. 3(2-2). Prereqs: ME 332. Wallace

**MSE 425** Biomaterials & Biocompatibility. 3(3-0). Prereq: PSL 250 or concurrently and MSE 250. Biomechanical Concentration Course. Baumann.

**MSE 426** Introduction to Composite Materials. 3(3-0). Prereq: ME 222. Xiao.


**MSE 466** Fracture & Failure Analysis. 3(2-3). Prereq: MSE 250 and Tier I Writing. Recommended background: MSE 320 and 331. Crimp/Lucas.

**ME 802** Advanced Classical Thermodynamics. Requires Override—See #3 Below. 3(3-0). Prereq: ME 412 plus GPA of 3.5+. Wright.

**OVERRIDE INSTRUCTIONS**

**ME Override Form Link:** [http://www.egr.msu.edu/me/undergrad/forms](http://www.egr.msu.edu/me/undergrad/forms)

1) ME 490–Independent Study: Find a professor who is willing to supervise your project, and discuss your plans with him/her. Complete an ME 490/490H Enrollment Contract, available in the ME Advising Office in 2560 EB. After you and your professor have signed it, return the form to the ME Advising Office for the remaining signatures and override.

2) Complete and submit the ME Override Request form: [http://www.egr.msu.edu/me/undergrad/forms](http://www.egr.msu.edu/me/undergrad/forms)
Fall Semester Calendar

November 11  All currently enrolled students who have not enrolled by 8 p.m. in at least one course for Spring will pay a $50 late fee.

November 18  Deadline for Withrow Teaching Award Nominations. The nomination form is located at: http://www.surveymonkey.com/s/9L7XFL8

Nov 24-25  Thanksgiving recess

December 9  Last day of classes & Design Day.

December 10  Undergrad Commencement Ceremony - Breslin at 2 pm. Lasts about 2 hours. No tickets required.

Dec 12-16  Final Exams

Dec 17-Jan 8  Semester Break

January 13  On-line Open Add Period for Spring 2012 ends at 8 p.m.

March 1  Approximate application deadline for April FE exam

March 12  Scheduled Computer/Telephone Enrollment period for summer semester begins.

March 30  Computer Enrollment period for fall/spring 2012-2013 begins. Your enrollment access date (the first time you can log on) will be posted on StuInfo in mid-March.

Design Day

Friday, December 9, 2011
MSU Union

Come and see our students lead, create, and innovate

Activities include:

- Competitions
- Presentations
- Demonstrations
- Awards