ME Senior Evan Racine is shown with the engineering group for his sustainable energy design course at the University of Edinburgh in Scotland, where he is studying abroad this semester. The group is standing in Teviot place in front of McEwan Hall, which is located in the central campus of the university in the city center. From left to right: Robin Ingram, Josh Werngren, Matthew Watson, and Evan. Two of Evan’s friends are from England and the other is from Scotland. Read Evan’s article on page 6.
Academic advisors do more than you might know. You have visited academic advisors since before you took your first class at MSU. They helped you through those first few (awkward) semesters. The expertise of your advisors goes beyond choosing your courses or certifying that you have met the requirements needed to graduate. They work behind the scenes to find resources needed to graduate. They lobby consistently to accommodate students. In my short time as Associate Chair, I’ve learned some of the many ways that she has worked tirelessly on your behalf for 30 years as of this June. In addition to knowing the ins and outs of the ME curriculum better than anyone, Ms. Griffore monitors section sizes and class lists and lobbies consistently to accommodate students. In my short time as Associate Chair, I’ve learned some of the many ways that she looks out for the best interests of the students. She works with Professor Diaz and myself to offer as many sections as resources allow. She also works with students, who are taking advantage of study abroad opportunities, to find courses at foreign universities that are equivalent to those in the ME curriculum at MSU. Students should consult with her as soon as they are eligible so that she can help you plan your curriculum for the most efficient journey through your engineering education.

Talk with your advisor. Listen to your advisor. Follow her advice.

### Curriculum News

- **BS 111–Cells and Molecules** is being changed to **BS 161–Cell and Molecular Biology** effective next fall.
- **BS 110–Organisms and Populations** is being changed to **BS 162–Organismal and Population Biology** effective next fall. Note: The lab for this course will be offered separately, and the prerequisite will be BS 161.
- **ME 285–Computer Aided Design Tools** will be offered both fall and spring semesters. Instructor: **Bob Chalou**. This course is an Other Elective.
- **ME 372–Machine Tool Lab** will be offered fall and spring semesters. Instructor: **Roy Bailiff**. **Manufacturing Concentration** students are given priority for seats in this course.
- **ME 481–ME Design Projects**: ME department approval is required before enrolling in ME 481. To obtain approval, submit the ME 481 Enrollment Approval Form located in the Forms/Handouts link on the ME undergraduate website. ME 481 must be taken during your last semester (or spring semester for August grads). If you do not have a long-term schedule on file, or if your old one needs to be updated, please call 517-355-3338 and schedule an appointment with Gaile.
• ME 491/001–Intro to Computational Fluid Dynamics will be offered Spring 2011 as a non-design intensive Senior Elective. It will be taught with graduate students who will take the course as ME 840, and who will have different assignments. For more information, see page 15.

Class Standing (Rank) information for ME juniors and seniors is available in the ME Advising Office. You will need to present your MSU I.D. card. ME sophomores can obtain this information in 1410 EB.

• ME Graduate Courses: If your GPA is 3.5 or higher, you may be able to take a graduate-level course and apply it to your Senior Electives. To obtain permission, complete a Graduate Course Override form, available in the ME Advising Office. This is a paper form.

• Prerequisites: The ME department expects all students, including members of the Honors College, to observe all course prerequisites. If you have a question, contact the ME Advising Office at 355-3338.

• Schedule Conflicts: The ME department will assist students with conflicts between required courses. However, the department does not overfill required courses to resolve conflicts with Senior Electives, Other Electives, Integrative Studies courses and employment schedules.

• Study Abroad: The ME department sponsors or co-sponsors study abroad programs in Denmark, France, Germany, Korea, Scotland, Peru and Taiwan. For more information, contact the ME Advising Office.

• ME 280 Honors Section: On April 15, open seats in ME 280H will become available to non-Honors College students with a 3.5+ GPA. via override.

Department News

• University Distinguished Professor Dr. Gary Cloud, P.E. has been selected by the Society for Experimental Mechanics to receive the Murray Medal and to deliver the Murray Lecture at the SEM XII International Congress and Exposition on Experimental Mechanics in June 2012 in Costa Mesa, CA. The William M. Murray Lecture and Medal constitute the most prestigious honor offered by the society. Lecturers are chosen two years in advance to allow ample preparation time. A paper based on the lecture is published in the journal Experimental Mechanics without prior review. Dr. Cloud is a Fellow of the society and has served as society president and in many other posts over a span of nearly 50 years.

• Professor Harold Schock 2011 Distinguished Faculty Award. Dr. Schock is responsible for establishing MSU as one of the premier universities for automotive research. He has led various teams in groundbreaking research on turbine, diesel and rotary engines. His expertise centers on improving engine efficiency using advanced design, the utilization of biofuel and the conversion of waste heat to electricity.

• Professor Tonghun Lee received the 2011 Teacher-Scholar Award, which is awarded to faculty who early in their careers have earned the respect of students and colleagues for their devotion to and skill in teaching and who have shown scholarly promise

• Professor Eann Patterson, ME Chairperson (2004-10), has accepted a position as the A.A. Griffith Chair of Structural Materials and Mechanics at the University of Liverpool. During his tenure at MSU Dr. Patterson made very significant contributions to the department through his pivotal role in the Composite Vehicle Research Center (CVRC).

Graduate School: Linked Program
by Professor André Bénard, Associate Chair for Graduate Programs

Linked BS-MS Program for Juniors: If you are interested in graduate school, it’s already 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 one semester (or more sometimes). It is important to apply now to allow flexibility in scheduling the three courses during your senior year. This can be combined with a summer research internship in a lab to get a head start on your research.

Stop by the ME graduate office (2418 EB) where Ms. Aida Montalvo can make an appointment with Prof. Andre Benard, ME graduate advisor, to discuss your options at MSU. Much information about pursuing graduate school at MSU can be found under www.epr.msu.edu/me/graduate

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Entrepreneurial Competition Drives MSU Student

by Sam Goodsitt

NOTE: Sam Goodsitt, ME Senior, is the first recipient of a $5,000 entrepreneurship grant through an endowment established last year by the Midland-based Rollin M. Gerstacker Foundation.

I am an undergraduate mechanical engineering student at MSU, and alternative energy has always been of great interest to me. One night after a physics class I began developing an idea for an energy conversion system. After a few months I took the idea to my academic advisor, Carmellia Davis-King who guided me to the newly developed Gerstacker Entrepreneurial Grant. According to its website, “The Gerstacker Foundation Entrepreneurial Grant Program is an opportunity for undergraduate students from the science, technology, engineering, and math (STEM) disciplines to compete for funding for a research concept with entrepreneurial potential.” I submitted the idea to the Gerstacker program in hopes of advancing the concept.

My initial proposal was an electromagnetic wheel designed to increase the driving range of hybrid and electric powered vehicles. The Gerstacker Committee awarded me $500 to pursue this idea. I also received supportive mentoring from Matt Birbeck, who is a supply-chain specialist at MSU. He helped me connect and collaborate with Tower Tool, a tool and die company in Macomb, Michigan, and I periodically commuted to Macomb County to build my prototype. Upon completion, I took my device to some MSU professors for consultation, and I was informed that the limitations of current technology make batteries incompatible with this invention. I was disappointed, but took stock in all I had done, and presented my work and findings to the Gerstacker Committee. Although my project did not turn out as I had hoped, the Gerstacker Committee recognized my hard work and passion. In order to encourage me, I was advised to treat this situation as a temporary roadblock and pursue other ideas.

My disappointment turned into inspiration. The purpose of this grant isn’t to fund one idea, but to encourage students to develop the knowledge, skills, and motivation required to pursue any idea. I returned to my original design, and recognized its unforeseen potential. With some drastic modifications, I formed the idea of a hybrid generator powered by both solar and wind energy. I presented this idea to the Gerstacker Committee, and was awarded the $5,000 grant. Dr. Craig Somerton, ME professor, supervised me in an independent study to develop and optimize the solar powered components. I have also consulted numerous other professors including: Dr. Wolfgang Bauer, Chairperson, professor and chairperson of the physics and astronomy department, Dr. Scott Kiefer, ME professor, and Dr. Andrew Mason, ECE professor. I am currently fabricating a working prototype on Michigan State University’s campus, and in addition, I have submitted this idea to General Electric’s “Ecomagination Challenge.” GE designated my submission among the top 100 ideas of the nearly 4,000 ideas submitted worldwide. You can listen to me talk about the hybrid generator at [http://challenge.ecomagination.com/ct/ct_list.bix?c=ideas]. If you would like more information, or want to apply for the Gerstacker Entrepreneurial grant, visit [http://gerstacker.msu.edu].

Study Abroad in France (ECAM in Lyon)
by Professor André Bénard

The Department of Mechanical Engineering offers a month-long study abroad program for junior-level students in Lyon, France each summer. The students stay at ECAM, a French engineering school located in the old part of Lyon, for the entire month of June. They are required to enroll for a minimum of 3 credits, and they can obtain equivalent credits for ME 410 (taught in English) or ME 416 - it will depend on the number of students. 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>
Study Abroad in Peru
by B.S. Thompson, Program Co-Director

Despite the spectacular successes of the interdisciplinary multi-college study abroad program in Peru, the 2011 offering of this flagship educational enterprise has been cancelled.

In 2012, however, we are hoping that students will again be able to return to Huamachuco and collaborate with indigenous hungry people living and dying in abject poverty.

This profound study abroad experience, involving both community engagement and field research, is classified as a semester-long summer program but in reality it starts at the beginning of the spring semester. In January a series of eclectic orientation meetings is initiated to complement one-on-one discussions with each academic advisor that will prepare the student for their project in the remote Andean town of Huamachuco.

Such rigorous methodical preparations have been the cornerstone of our success in Peru because they enable students to refine their Spanish language competency and cultural understanding in the city of Cusco before they fly north to undertake their project work. In 2010 the inter-disciplinary projects involving engineering students were associated with the application of solar energy technologies to enhance community health and human nutrition in a population where 85 percent live in a state of poverty. Solar water heaters were designed and installed at two remote health posts and at schools to facilitate the cleansing of the skin by showering and hand washing before meals. This effort was directed to mitigate dysentery and dermatological ailments. A second team designed and manufactured a solar powered dehydration tower to process horticultural produce that enables crops to be stored for extended periods, long after harvesting. This device is being commercialized by the Peace Corps and a local non-governmental organization (NGO) called Proyecto Amigo.

If you are interested in participating in the 2012 program, please contact Professor Thompson (thompson@egr.msu.edu) for more information.

MSU – RWTH Aachen Program by Dr. John Foss, Program Director

An incredible experience: Aachen, Summer 2012!

Consider that you are in an interview for employment or graduate school or an exclusive fellowship and the question is posed: “What exceptional experience characterized your undergraduate experience at MSU?”

“I was selected to be a part of the MSU/RWTH-Aachen Exchange Program where I carried out a research project at one of the premier technical universities in Europe, studied the German language in its natural surroundings and was able to explore Europe on the available three-day weekends” would seem like a very good answer to the question . . . even if it were never asked.

This program can accommodate up to 10 students. A minimum GPA of 3.0 is required and all students will have a minimum of German 101 before departure in mid-May. The program will end on the last Friday of July 2012.

Interested students are encouraged to contact Prof. J. Foss (foss@egr.msu.edu). Former students of the program are available to answer questions about their experience. Our Program Coordinator: Ms. S. Mostert, will be at MSU in April, and 2012 candidates are welcome to interact with her during that visit.

Enroll in Your Summer Classes ASAP!

Enrollment for summer courses begins on March 15, and your enrollment date is posted in StuInfo. The ME department will be reviewing the summer enrollments in April, and underenrolled courses may be cancelled.

• It is in your own best interest to enroll in your summer courses as soon as you have access to the enrollment system.

• Low summer enrollments could mean canceled courses.

The following courses are on the summer schedule and will be of interest to ME majors:

• First Session: CE 221; ME 361, 391, 410; MSE 250; STT 351.

• Second Session: ME 201, 222, 471; STT 351.

• Full Session: ME 332, 412, 461 and 490.

You will also find several Integrative Studies and Bioscience courses, plus courses that can be used as Other Electives.

Some extension courses, including ISS and IAH, will be offered in the Detroit, Flint, and Grand Rapids areas. In addition, many online courses, including Integrative Studies, will be offered.

►IMPORTANT: if you decide to take the prerequisite for an ME course at another institution this summer, you must follow the Special Override instructions for Transfer Prerequisite Override Requests (see Special Overrides on page 13).
Hello Spartan Engineers!

My name is Evan Racine and I am a mechanical engineering student spending the semester abroad in Edinburgh, Scotland. I’m here as part of MSU’s Global Engineering Program. So far my time here has been great. I’m studying at the University of Edinburgh, one of the oldest universities in the United Kingdom. The campus is set right in the city center which is about a ten-minute walk from Edinburgh Castle and Old Town. Considered to be one of the most beautiful cities in Scotland, Edinburgh is pushed right up against the coast of the North Sea by the Scottish highlands that surround it. It’s an exciting change of scenery from East Lansing.

The students at the University of Edinburgh are from all over the world. There are about 8,000 international students. It seems I’ve met students from just about every corner of the globe. There is a society specifically for international students that arranges trips throughout the semester to places all around Scotland: Loch Ness, St. Andrews, Glasgow and Scotland’s lake district to name a few. So I am getting to see all of Scotland during my time here.

The classes here are organized somewhat differently, but it didn’t take long to adjust. The Engineering College has a separate campus. I’m taking a sustainable energy course, where the entire class is working together to design a six megawatt wind turbine from the ground up. It’s challenging but I’m learning a lot.

One of the great things about the semester schedule here is a three-week spring break. After classes are finished, the school breaks for three weeks before final exam review and exams start. During that time, I have made plans to travel throughout the rest of Europe with another MSU student studying abroad.

So far, it has been an unforgettable journey and it’s not even half over. Experiencing a different culture and meeting new friends has been amazing. Good luck with the rest of your semester at MSU.

GO GREEN!

-Evan Racine

For more information about this exciting study abroad program, contact:

• Gaile Griffore, ME Advisor
  Office 2560 EB / Phone: 517-355-3338
  Email: griffore@egr.msu.edu

• Maggie Blair-Ramsey, Coordinator Engineering Study Abroad Program
  Office: 1108 EB / Phone: 517-432-2012

Academic Advising

1) ME Freshmen are advised in W-8 Wilson Hall on a walk-in basis only.

2) Most Sophomores (see item 3 below) are advised by Carmellia Davis-King. To schedule an appointment, call 355-6616 x 1, or go to 1410 EB.

3) Juniors-to-Be with a 3.0+ GPA plus ME Juniors and Seniors are advised by Gaile Griffore. For an appointment, call 355-3338, or go...
Fall 2010 Dean’s List

Congratulations to the following 209 mechanical engineering majors who made the Dean’s List after Fall Semester with a semester GPA of 3.5 or higher. This list was taken from the Registrar’s official website, which is updated regularly: http://www.reg.msu.edu/ROInfo/GradHonor/DeansList.asp.


Congratulations and best wishes to all ME graduates! On behalf of the 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 March 1. If your name is missing, please contact me immediately at griffor@egr.msu.edu (Tel: 517-355-3338). — Gale

May Graduates

Luis Roberto Alvarez
Peter David Anthony
Andrew Michael Armstrong
André Chanyawatanakanal
Benjamin John Cherwiniski
Andrew Otello Chiesa
Michael Christopher Conboy
Kylar James Dailey
Trevor Steven DeLand
Thomas Michael Dennis
Matthew J. Flis
Katelin Ann Friederichs
Darren Jon Hym Fung
Alex Joseph Gage
David Peter Goshgarian
Brandon Joseph Gray
Harold Alonzo Hill
Motozo Horikawa
Alexander Lawren Hsieh
Nicholas James Huehl
Rachel Lynn Jacquin

August Graduates

Hassan Abdulillah Alzayer
Kyle Joseph Anderson
Kevin Philip Compau
Brent Charles Ewald
Nathan Paul Geib

79 Seniors to Graduate in May and August!

Sachin Damodar Golhar
Jarreau Richard Jackson
Hasib Mohammed
Adam Laurence Nelligan
Manila Ounsombath
Jonathan Chase Pishney

Putnam, Andrew Putz,
My main research interest is in the development of multifunctional materials for extreme applications. In particular, I am conducting two research programs in my laboratory, including advanced cutting tools and perspirable skin.

The cutting tool research is being conducted with support from the National Science Foundation, Boeing, ARMY, Los Alamos National Lab., Fraunhofer and a few cutting tool companies. The cutting tool is an essential, consumable component of the machining process where undesired excess material is removed from a starting work material so that the remaining part becomes closer to the desired shape (Fig. 1). It is typically made of tungsten carbide in a cobalt matrix with thin layers of ceramic coatings such as TiAlN and Al2O3. The coatings must be customized depending on the work material being cut and cutting conditions.

Requirements for cutting tools are quite complex. In addition to a high temperature/gradient (reaching beyond 1000 degrees Celsius in many applications) and intense mechanical load, they have to resist wear. Recently we have proposed that generalized dissolution wear occurs where the tool materials dissociate, dissolve and eventually diffuse into the work material. This theory can explain the reason for the diffusion-dominated wear mechanism when machining titanium and the dissolution-dominated wear mechanisms when machining ferrous and nickel-based materials. This is demonstrated in Fig 2.

NOTE: All graphics for this article were provided by Professor Kwon.
To test this theory, we are conducting machining experiments with various work materials such as steels and titanium and measuring the wear progress through a confocal microscope. Examples of confocal images after they are processed through a filtering scheme are shown in Fig 3. The set of the images was obtained by interrupting the machining process and retrieving the cutting tools after machining 1, 3, 5, 8 and 10 min. These images can be represented in a near nanoscale accuracy where the wear patterns can be analyzed to propose the possible wear mechanism such as generalized dissolution wear.

Perspirable skin is a new concept for an autonomous self-cooling multi-functional material for a reentry or supersonic vehicle. The basic configuration of the perspirable skin is a peg-and-hole arrangement of two materials with a distinct coefficient of thermal expansion (CTE) that has been shrink fitted. The interference between the peg and hole is designed to open when the surface temperature is high. In the application with the reentry or supersonic vehicle, atmospheric air bombards the surface of a vehicle causing high frictional heat flux. The interference allows compressed air to be expelled through the interference as shown in Fig. 4. Thus, instead of the frictional heating, the compressed air, as extracted out of the interference, is mixed with the atmospheric air, intending to eliminate most of the frictional heating. The self-regulating cooling characteristic is completely reversible as the interface will close when the surface is cooled. The design and fabrication of various materials being considered, including the materials with negative CTE and a designed gradience, have been completed for the construction of perspirable skin.

Recently, we have been exploring another completely different approach using thermal buckling. A set of tiles is being designed as a core to buckle under intense thermal loading. A finite element simulation to attest to its feasibility is shown in Fig. 5.

These materials are made of high temperature ceramic materials. To process such materials, understanding of compaction and sintering behaviors of the powers are being studied.
So you’ve got a job offer. Now what? Dedicate some time to look it over!

1. Does the pay measure up?
2. How are the benefits?
3. Adequate Training?
4. Acceptable Location?

YES: Sign Away!

1. Make sure you are talking to the right person!
2. Research Pay range
3. Prepare & Practice
4. Support pay range with skills

No: do the “Ask”

Learn more @The Center, 1340EB careers@egr.msu.edu

How to play your cards right: Turn an offer into your Dream Job

Working on your Communication by Craig Gunn, Director of Communications

Every once in a while, I feel that people are making me do more work than I should on this or that project. It might relate to looking over that project another time after I spent hours pouring over the text already or going back over wording that might just not be exact enough. I start to get whiny and imagine that I am being put upon for no good reason. Then it hits me. With all the work that I will devote to the text, the end product really makes me look good, improves my ability to edit, and gives me a fair amount of satisfaction when the text is well received. The message that gets through my rather thick scull is that a little bit of extra effort when writing and thinking about the text we create goes a long way in the educational system and in our future real-world professions.

As an engineer, one might argue that there is no need to be concerned about improving one’s communication. That is the focus of arts and letters people, and engineers should concentrate on numbers and symbols. That is a fine argument until one realizes that communication is not limited to writing a poem or speaking a good speech, producing a good play or penning a novel. Communication is a whole lot more than that. It is in actuality what we do, day in day out, minute by minute, second by second. We are walking, breathing, thinking, and living communicators. We communicate through our spoken words, our body language, and our written text. We wake up in the morning communicating to ourselves and others, and we fade into the communication that takes place in our dreams after we think we are done for the day. So if we make a conscious effort to evaluate how we communicate, maybe there will be a noticeable improvement in that communication, whether it be oral or written or any other form of communication of which we can think. Taking that extra step can place us far above our competitor communicators. And in this economy, that step may be the difference between getting that job or not.

Learn more @The Center, 1340EB careers@egr.msu.edu
Formula SAE

Team members continue to bounce between class and the Jolly Road Engineering Shop as they build Car 51, the MSU Formula Racing Team’s 2011 entry in the Formula SAE Michigan competition. Team members dedicated their winter break fabricating the chassis and many of the smaller, more complex components of the race car. Due to the hard work put forth by members, the MSU Formula Racing team will be able to finish this year’s race car by the spring break testing date. We would like to thank all of our sponsors; faculty and staff who have helped make our goals possible this year.

The 2011 Formula SAE Competition will take place at Michigan International Speedway on May 11th-May 14th. There are 120 teams from all around the world looking to compete in the 4-day competition. I encourage everyone to come out and support the team! Also, we are always looking for new members to come get involved with the team. If interested, please contact Josh Frontiera (frontie5@msu.edu). Submitted by Josh Frontiera, Project Manager

MSU Solar Car

The Michigan State University Solar Car Racing Team is happy to inform you that they are indeed racing this year at the Formula Sun Grand Prix (FSGP) Race located at the Indianapolis Speedway this year to celebrate the Indianapolis Speedway’s 100th year anniversary. Even though the race is schedule for MSU’s finals week, the College of Engineering and professors has been very supportive of the Solar Car Team making their first lap ever on a regulated track, and there is a small group that will be making the short trip to Indiana this May.

The Mechanical Team has been diligently working on the year off from the race and has made some strides with improvements to the 2009 vehicle. There is a new front end, adjustable pedals for those too short or too tall to be a driver, and new fiber glass body parts fabricated. The Electrical Team is developing two different battery boxes (lead acid and lithium ion) and focusing a lot on the programming end of all the inner electrical workings for the Solar Car. Thanks to all the support of the College of Engineering, professors and recent donors, the Solar Car may finally make that first lap around the Indianapolis Speedway, May 2-7, 2011. Submitted by Manila Ounsombath, Business Manager.
Pi Tau Sigma

The Tau Epsilon chapter of Pi Tau Sigma has had a busy start to the semester. We started the semester off 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. We invited all eligible members to join us and learn more about our organization. Next, we volunteered to help out with the MSU student food bank. Our members enjoyed helping out our fellow students.

On March 16 we are putting on “Senior Elective Night” at 7-8 p.m. in 3400 EB. This event aims to inform juniors and seniors to be of all the elective classes they have to choose from in our department. This will be both fun and informative. Later in March, we will meet up for dinner at Crunchy’s. We started this event last semester and hope to continue it as a fun tradition.

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

Submitted by Peter Koenigsknecht, President.

Baja SAE

The Michigan State Baja Racing team has made significant progress this racing season! The team recently returned from the Blizzard Baja competition hosted by Michigan Tech up in Houghton Michigan. Three vehicles were raced, giving new members ample opportunity to gain driving experience. Out of the 44 registered vehicles, we placed 3rd place overall! Returning from the invitational, the team has shifted its focus to the upcoming SAE competition.

Keeping up with tradition, the team is racing two vehicles at the SAE Birmingham water competition. The 2010 vehicle which placed 8th place overall last year at SAE Rochester is being re-raced alongside the new 2011 vehicle. Because of our top-ten finish the team is required to impose significant design changes, on the 2010 vehicle. Design is complete, and construction is well underway; the 2011 vehicles’ chassis is complete and rolling! Currently we are in the midst of completing the water propulsion components that will make the cars amphibious and able to drive over water!

Baja is a great way to get hands on engineering skills. We still have upcoming competitions for the racing season: SAE Birmingham (April 16 -19), SAE Kansas (May 26t -29), and SAE Illinois (June 11 -14). If you’re interested in joining the team, we’re always recruiting new members! There is no experience required to join the team; we’ll teach you any necessary skills you may need to be successful. Generally we meet on the weekends at the SAE Shop out at Jolly to work on the construction of the cars. Contact us at: michiganstatebaja@gmail.com Submitted by Jelena Parapovic, Project Manager.
Michigan State University

The MSU Student Chapter of the American Society of Mechanical Engineers (ASME) is dedicated to helping students network outside the classroom and providing opportunities to meet with other MSU mechanical engineering students and faculty.

During the Spring Semester of 2011, many new paths for the MSU chapter began, which range from partnering up with new student organizations such as Pi Tau Sigma, SAE Formula, and Triangle Fraternity, as well as holding a completely new Junkyard Wars event that included building hovercrafts during Engineer’s Week. Stay tuned for more news around the Engineering Building for upcoming ASME events such as a presentation held by The Broad Graduate School of Business on engineers going back to school for an MBA and a Dodge Viper presentation and display.

ASME has recently been much more engaged in trying to reach out to new members and potential leaders across the MSU College of Engineering. As always, ASME would like to further develop its E-Board and is looking for new students that have an interest in planning events for the College and want to add depth to their resume. If you have any interest in joining ASME’s E-Board, please contact Dr. Steve Shaw or Chad Payne. Partaking in leadership roles across the University and College can lead to great self-reward!

ASME wishes you the best of luck during the Spring 2011 semester. We hope you have a great summer, whether you are doing research, studying abroad, or working at the internship of your dreams. See you at the next event! Go Green! Submitted by Chad Payne, ASME President.

Special Overrides

- **Transfer Prerequisite Override Requests**: If you plan to take the prerequisite for an ME course at another institution this summer, you must submit a Transfer Override Form, so that you can receive a prerequisite override and enroll in the next course in the sequence. The form can be found at [http://www.egr.msu.edu/me/undergrad/forms](http://www.egr.msu.edu/me/undergrad/forms).

- **ME 410 and 412**: may be taken concurrently during Summer Semester only, but you will need a prerequisite override for ME 412. First enroll in ME 410. Then, submit the ME Override Form on the ME undergraduate website. Select “Other” for Reason for Request and write that you are taking ME 412 concurrently with ME 410 this summer.

- **ISS 3xx Overrides**: Students who transferred their first ISS course need a prerequisite override before enrolling in ISS 3xx. To obtain the override: Go to 302 Bierce Hall on Monday-Friday at 8:30 a.m.-4:30 p.m. Say that you transferred your first ISS and you need a prerequisites override to take the 300-level course. Be prepared to tell them the course number and section you are requesting. **Note**: You must select a section that has an open seat. You will NOT receive an override for a full section.

American Society of Mechanical Engineers

![Building a hovercraft for Junkyard Wars 2011](image)

**PHOTO BY CHAD PAYNE**
## Department of Mechanical Engineering

### ME Senior Electives for 2011-2012

- The following ME Senior Elective list, including instructor assignments, was accurate as of March 5, but it is subject to change. Important changes will be emailed to you with “ME Bulletin Update” on the subject line.
- Design Intensive courses have an asterisk (*) after the course number.
- Descriptions are provided for courses that are not in the catalog. All others can be found by going to [http://www.reg.msu.edu/Courses/Search.asp](http://www.reg.msu.edu/Courses/Search.asp).
- The ME department cannot overfill a required course or section to solve a Senior Elective schedule conflict.
- Course override instructions can be found in the shaded BOX on page 15.

### SUMMER SEMESTER

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<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites</th>
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<tbody>
<tr>
<td>ME 490</td>
<td>Independent Study</td>
<td>1-4</td>
<td>See Override Instruction #3 on page 15</td>
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### FALL SEMESTER

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<th>Prerequisites</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ME 416*</td>
<td>Computer Assisted Design of Thermal Systems</td>
<td>3(4-0)</td>
<td>ME 410 or concurrently. Somerton.</td>
<td></td>
</tr>
<tr>
<td>ME 422</td>
<td>Introduction to Combustion</td>
<td>3(3-0)</td>
<td>ME 332 or concurrently. Lee.</td>
<td></td>
</tr>
<tr>
<td>ME 423</td>
<td>Intermediate Mechanics of Deformable Solids</td>
<td>3(3-0)</td>
<td>ME 222. Xiao.</td>
<td></td>
</tr>
<tr>
<td>ME 425</td>
<td>Experimental Mechanics</td>
<td>3(2-3)</td>
<td>ME 222. Tekular.</td>
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</tr>
<tr>
<td>ME 440</td>
<td>Aerospace Engineering Fundamentals</td>
<td>3(3-0)</td>
<td>ME 332 or concurrently. Engeda.</td>
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<tr>
<td>ME 444</td>
<td>Automatic Engines</td>
<td>3(3-0)</td>
<td>ME 410 or concurrently. Schock.</td>
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</tr>
<tr>
<td>ME 456*</td>
<td>Mechatronic System Design</td>
<td>3(2-3)</td>
<td>ECE 345 or concurrently and ME 391 or concurrently. Radcliffe.</td>
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</tr>
<tr>
<td>ME 465*</td>
<td>Computer Aided Optimal Design</td>
<td>3(3-0)</td>
<td>ME 471 or concurrently. Diaz.</td>
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</tr>
<tr>
<td>ME 477</td>
<td>Manufacturing Processes</td>
<td>3(3-0)</td>
<td>ME 222, MSE 250, and Tier I Writing. Thompson.</td>
<td></td>
</tr>
<tr>
<td>ME 490</td>
<td>Independent Study</td>
<td>1-4</td>
<td>See Override Instruction #2 on page 15</td>
<td>You may reenroll for a maximum of 6 credits.</td>
</tr>
<tr>
<td>ME 494</td>
<td>Biomechanics and Heat Transfer</td>
<td>3(3-0)</td>
<td>ME 410 or concurrently. Biomechanical Concentration Course. Wright.</td>
<td></td>
</tr>
<tr>
<td>CHE 472</td>
<td>Composite Materials Processing</td>
<td>3(2-3)</td>
<td>ME 332. Jayaraman.</td>
<td></td>
</tr>
<tr>
<td>ECE 491</td>
<td>Special Topics</td>
<td>Section 601. Topic: “Acoustics.” 3(3-0). See Override Instruction #4 on page 15. Course Description: Review of Laplace and Fourier transforms, waves in one dimension, the acoustic wave equation, transmission and reflection, radiation and diffraction, absorption and attenuation, cavities and waveguides, resonators and filters. Prereq: (EGR 102 or CSE 131) and (ECE 345). McCough.</td>
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<tr>
<td>MSE 451</td>
<td>Microscopic &amp; Diffraction Analysis of Materials</td>
<td>3(2-3)</td>
<td>PHY 184. Recommended background: MSE 350 &amp; 381. For more info, see Override Instruction #5 on page 15. TBA.</td>
<td></td>
</tr>
<tr>
<td>MSE 454</td>
<td>Ceramic &amp; Refractory Materials</td>
<td>3(3-0)</td>
<td>PHY 184. Recommended background: MSE 350 and 381. See Override Instruction #5 on page 15. TBA.</td>
<td></td>
</tr>
<tr>
<td>MSE 476</td>
<td>Physical Metallurgy of Ferrous &amp; Aluminum Alloys</td>
<td>3(3-0)</td>
<td>MSE 250. Recommended background: MSE 310. For more info, see Override Instruction #5 on page 15. TBA.</td>
<td></td>
</tr>
<tr>
<td>ME 812</td>
<td>Conductive Heat Transfer</td>
<td>3(3-0). See Override Instruction #6 on page 15. Prereq: ME 412 plus GPA of 3.5+. Wright.</td>
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</tr>
</tbody>
</table>

### SPRING SEMESTER

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 417*</td>
<td>Design of Alternative Energy Systems</td>
<td>3(3-0)</td>
<td>ME 410 or concurrently. Bénard.</td>
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<tr>
<td>ME 442*</td>
<td>Turbomachinery</td>
<td>3(3-0)</td>
<td>ME 332. Engeda.</td>
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<tr>
<td>ME 445*</td>
<td>Automotive Powertrain Design</td>
<td>3(3-0)</td>
<td>ME 444. Novak.</td>
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</tr>
<tr>
<td>ME 464</td>
<td>Intermediate Dynamics</td>
<td>3(3-0)</td>
<td>ME 361. Shaw.</td>
<td></td>
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<tr>
<td>ME 475*</td>
<td>Computer Aided Design of Structures</td>
<td>3(2-3)</td>
<td>ME 471 or concurrently. Averill.</td>
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</tr>
<tr>
<td>ME 477</td>
<td>Manufacturing Processes</td>
<td>3(3-0)</td>
<td>ME 222, MSE 250, and Tier I Writing. Thompson.</td>
<td></td>
</tr>
<tr>
<td>ME 478</td>
<td>Product Development</td>
<td>3(3-0)</td>
<td>ME 477 and Tier I Writing. Kwon.</td>
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</tr>
</tbody>
</table>
ME 490 Independent Study. 1-4 credits. See Override Instruction #2 below. You may reenroll for a maximum of 6 credits.

ME 491 Selected Topics in Mechanical Engineering. Section 001: Intro to Computational Fluid Dynamics. See Override Instruction #1 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 #1 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 #1 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.


BE 445 Biosensors for Medical Diagnostics. 3(3-0). (BS 111) and (CEM 141) and (ECE 345). Biomechanical Concentration Course. Alocilja.


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

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. For more info, see Override Instruction #5 below. TBA.

ME 802 Advanced Classical Thermodynamics. 3(3-0). See Override Instruction #6 below. Prereq: ME 412 plus GPA of 3.5+. Engeda.

**OVERRIDE INSTRUCTIONS**

1) Complete and submit the ME Override Request Form: [http://www.egr.msu.edu/me/undergrad/forms](http://www.egr.msu.edu/me/undergrad/forms) [Click on Forms & Handouts]. Please note that the ME department cannot overfill required courses to resolve conflicts with Senior Electives, Other Electives, Integrative Studies courses and employment schedules.

2) ME 490–Independent Study Enrollment Procedure: Find a professor who is willing to supervise your independent study, and discuss your plans with him/her. Complete an ME 490/490H Enrollment Contract (independent study form), available in the ME Advising Office in 2560 EB. After you and your professor have completed and signed both sides, return the form to the ME Advising Office for the remaining signatures, override, and enrollment.

3) Six seats in ECE 415 have been allocated for MEs who are on record as Manufacturing Concentration students. If you are one of those students, send an email to Gaile [griffoe@egr.msu.edu](mailto:griffoe@egr.msu.edu) and request your override. Be sure to include your PID number and mention that you are on record as a Manufacturing Concentration student. (To be “on record,” you must first meet with Gaile to plan a long-term schedule.) ALSO, a prerequisite override will be given to students who will need to take ECE 415 & ME 461 concurrently.

4) ECE 491/601–ECE Override Request form: [https://www.egr.msu.edu/ece/Undergraduate/Override/eceoverride.htm](https://www.egr.msu.edu/ece/Undergraduate/Override/eceoverride.htm)

5) ME majors do not need to have taken the Recommended Background courses, but there will probably be a need for some additional background reading. Contact the professor for more information.

6) Complete the Graduate Course Override form, available in the ME Advising Office in 2560 EB. This is a paper form.
Spring Semester Calendar

March 16  Pi Tau Sigma Event: Senior Elective Night. 7-8 p.m. in 3400 EB.
April 1  Computer enrollment begins for Fall ’11 / Spring ’12.
April 29  Design Day in the MSU Union. See you there!
May 2-May 6  Final Exams.
May 6  University Undergraduate Student Convocation—1:00 p.m. in Breslin.
May 8  College of Engineering Undergraduate Commencement Ceremony, 12:30 p.m. in Breslin. Lasts about 2 hours.
May 16-June 30  First Summer Session.
July 5-Aug 18  Second Summer Session.
May 16-Aug 18  Full Summer Session.
August 11  First Fall 2011 Minimum Tuition & Fee payment due.
September 1  Application deadline for October FE exam.
August 31  Fall Semester classes begin.