

ME Bulletin

News for
Mechanical
Engineering Majors

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- Curriculum News !
2
- COVER STORY!
8
- Senior Electives !
14

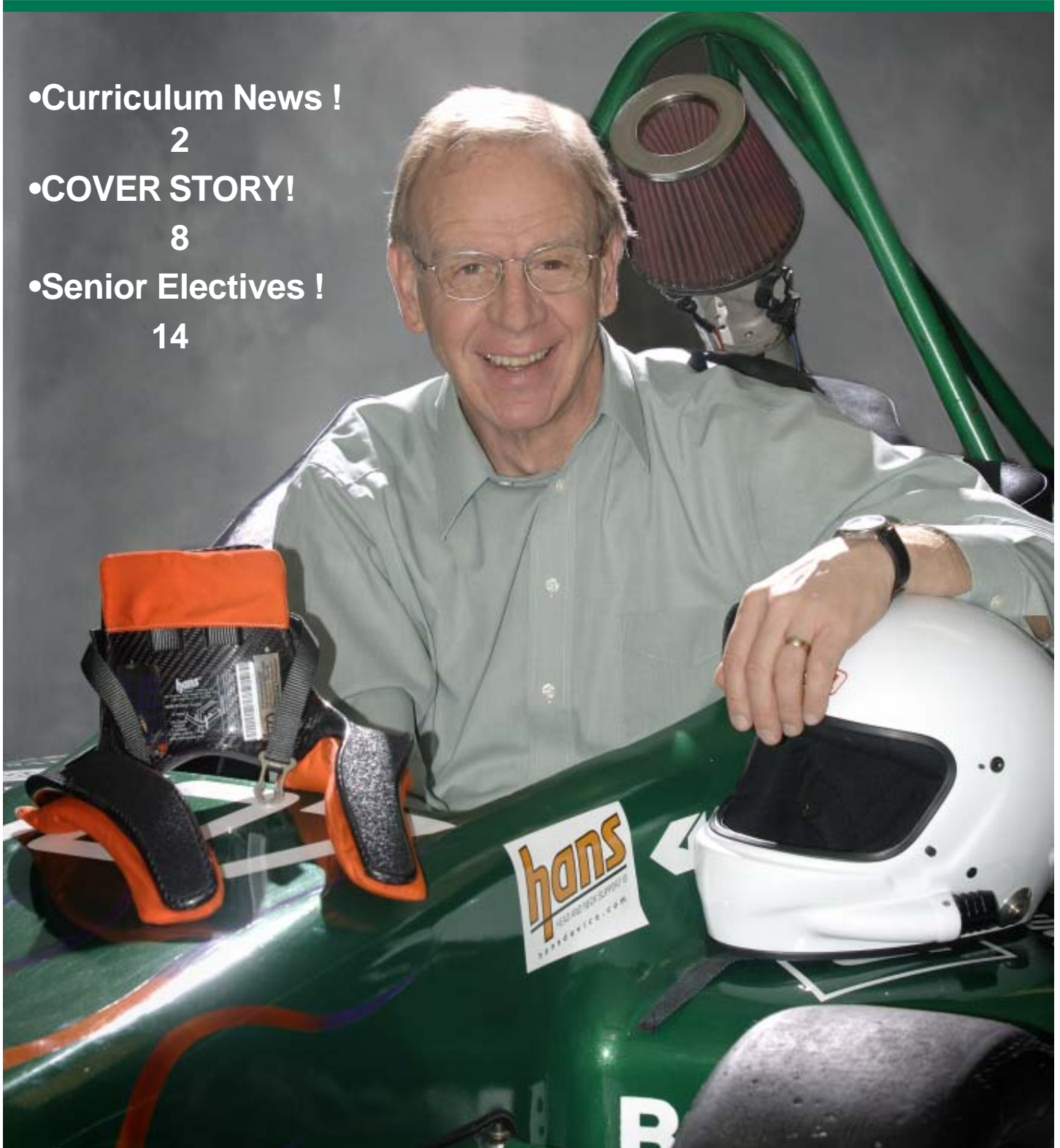


PHOTO BY HARLEY SEELEY

Professor Bob Hubbard is shown in the SAE Formula car with his HANS® Device (left). Bob invented this device to prevent basilar skull fractures, like the one that killed Dale Earnhardt in the 2001 Daytona 500. Read about Bob's life and work on page 8!

Department News



Professor Robert ("Bob") Hubbard will retire this summer after 29 years of service on the faculty at MSU. Dr. Hubbard received his Ph.D. from the

University of Illinois in 1970. He has conducted research and taught courses in the areas of biomechanics and biomechanical product design. Read about his life and research on page 8.

Kayla Batchelor (May 2006 graduate) has been selected to receive a Senior Class Council Outstanding Senior Award for her exemplary academic and extracurricular success, and strong sense of leadership, commitment and dedication to MSU.

Neil Bockemeier and **Ryan McCollum**, were two of the six students honored as MSU Board of Trustee Academic Achievement

Award winners at the Fall 2005 commencement. All six students had achieved a perfect 4.0 grade-point average. Neil is a 2001 graduate of Okemos High School, and Ryan graduated in 2001 from Flushing Senior High School.

The MSU Student Chapter of ASME will be hosting the 2006 Midwest Student Leadership Conference here at Michigan State on April 7-9. It is expected that approximately 300 students from around the region will be here to participate in design competitions, presentation competitions, and leadership activities. For more information, contact the Conference Coordinator, **Andrew Stewart**, (stewa257@msu.edu) or the Student Section Advisor, **Professor Somerton** (somerton@egr.msu.edu)

The National Football League Charities Foundation recently funded a medical grant application by mechanical engineering professor, **Dr. Roger Haut** and Ph.D candidate **Eric Meyer** along with co-investigators

from Sports Medicine and Radiology. The grant, entitled "An Experimental Model and In Situ Risk Assessment Tool for the Study of High Ankle Sprains" will last for approximately one year. Syndesmotic, or "high ankle" sprains are a serious injury occurring in sports like football, hockey and skiing, that typically require at least four weeks before any return to activity. In this study external rotation experiments on cadaver ankles will be carried out at increasing force levels, until a clinically relevant joint separation is documented. This information will result in a criterion for the force level required to produce injury in the syndesmotic ligaments. Additionally, a mechanical surrogate of the ankle will be constructed and used to measure the peak rotational moment at break-away for three different football playing surfaces, such as natural grass, astroturf and rubber in-fill. The results of this study will be helpful for the evaluation of new injury prevention strategies.

New Building Progress Report

The New Energy and Automotive Research Laboratory (EARL) is under construction and is scheduled for completion in 2006. After equipment installation, a dedication ceremony is planned for summer 2007. This 29,000 foot building, located on the east side of campus next to the Engineering Research Complex, will include labs for powertrain and energy research, as well as two new engine test cells with a shared control room, plus faculty and graduate student offices and conference rooms.

The photos below were taken on February 28. The one on the left shows the west wall of the one-story wing of the building that will include offices and energy labs. The other photo shows the east wall (left) and north wall (right) of the two-story wing that will house the test cells.



Associate Chair's Corner by Professor Craig W. Somerton



Why do certain courses count as Senior Electives or Design Intensive Senior Electives and others do not? For example, AE 254-Fluid Power Technology seems like a course that could be very useful to a mechanical engineer working for a company like John Deere. ITM 414-Enterprise Resource Planning Systems would seem ideal for our graduates that go into engineering management. There are several other courses that seem very appropriate for the education of a mechanical engineer, but the department will not count them as Senior Electives or as Design Intensive Senior Electives. The heart of the issue lies in accreditation. Your BSME degree is accredited by ABET, which means that certain conditions must be met. One such condition is that the degree must include 48 credits of engineering topics. We use our Senior Electives to satisfy this criterion. The other reason behind the nature of Senior Electives lies in the faculty's desire for our graduates to have some practice in using their engineering science courses such as dynamics or heat transfer. Several years ago the faculty approved the following definitions for Senior Electives and Design Intensive Senior Electives and they are provided below.

Mechanical Engineering Undergraduate Program Definitions

Senior Electives

Students completing the B.S.M.E. degree are required to take three Senior Electives (courses, 9 credits). This requirement is intended to provide students with an opportunity:

- to practice the engineering science they have learned in previous courses in an application area. For example, ME 444 – Automotive Engines utilizes the thermodynamics, fluid mechanics, and heat transfer previously learned in ME 201, ME 332, and ME 410.
- to broaden their mechanical engineering education into application areas not covered in the required courses. An example of this is ME 422 – Combustion.
- to deepen and strengthen their background in a fundamental area of mechanical engineering, such as fluid mechanics by taking ME 432 – Intermediate Fluid Mechanics.

Design Intensive Senior Electives

Students completing the B.S.M.E. degree are required to take one Design Intensive Senior Elective (one course, 3 credits). This requirement is intended to provide students with additional experience in the *analytical design component* of the design process. Although the required design courses, ME 371, ME 412, ME 471, and ME 481, all include analytical design, quite often this component is overwhelmed in the students' learning experience by the build and test component of the design process. It is important that ME graduates have the ability to develop and use predictive models in the analysis step of the design process, including the use of these models in parametric studies. Courses that qualify as Design Intensive Senior Electives have been reviewed and approved by the ME faculty through the ME Undergraduate Curriculum Committee, and at least 50% of each course is dedicated to analytical design.

I hope this helps explain why your program includes Senior Electives and what makes a Senior Elective.

May Madness is Coming! Are You Ready?

It is that time of year again! No, we are not talking about the college basketball play-offs, though the same excitement, anxiety, tension, triumph, and upset associated with the final four and championship game can grip its participants.

We do mean *May Madness!*

May Madness describes the period from now until the last day of Spring Semester and your efforts to find a Co-op, internship, or full-time permanent employment, while you are juggling papers, projects and finals on your way to academic success. Are you ready? Mark your calendars and take advantage of the following events and resources to help you

March 13 – The First Day After Spring Break

Visit www.egr.csp.msu.edu, your College of Engineering/Career Services & Placement Corner. Featuring career development and job search information specifically to meet your needs as a technical major, the CECSPC is designed as a "virtual conversation" with **Jim Novak**, your College of Engineering Field Career Consultant. This site will enable you to learn...

- "All of the Right Moves" for positioning yourself for success in engineering, upon graduation.
- Job Search Basics to help you articulate how you can fill an employer's needs.
- All of the tools that Career Services & Placement puts at your disposal for career achievement.
- How to look beyond the Internet for jobs in your field.
- And more...

Sophomores/Juniors; there is still time to find an internship!

- Go to "Think Cooperative Education" and click on "Engineering Resumes 2004-2005." Applying the User Name: jimnovak, and PASSWORD: msuracing, view the Excel document which tells you where students in your major have served in Co-op or Internship assignments in the past (Be sure to look at the bottom for your major). Pick out twenty companies of interest (rank them by favorite first) and go to www.csp.msu.edu/advising to sign up for an hour long appointment with Jim Novak to make phone calls to develop an internship opportunity for you.

March 24, 2006 – The Michigan Collegiate Job Fair

A state-wide, ALL MAJORS job fair will be held at the Burton Manor in Livonia, Michigan from 9:00 a.m. to 3:00 p.m. Go to www.mcjf.org to learn more about the employers attending and registration. There is a \$10.00 fee for students to attend.

April 3 to 14 – 2nd Annual Michigan Collegiate Virtual – GENERAL Job Fair

Sponsored by the same people who will bring you the Michigan Collegiate Job Fair, this VIRTUAL career fair will give you an ON-LINE last chance to bid for Co-ops, internships and full-time jobs. Visit <http://www.mcvjf.org> to learn when and how you can submit your resume. Last year over 100 employers participated in this ALL MAJORS fair.

So, be prepared. May Madness is coming!

Submitted by Jim Novak, Field Career Consultant, College of Engineering, 1410 A Engineering Building, novakja@msu.edu

The Graduate School Opportunity

by Prof. Clark Radcliffe Associate Chair for the Graduate Program

Graduate School is an opportunity for students to advance their professional career through a program that is custom designed to fit the professional interests and needs of each individual student. This is very different from an undergraduate program whose 128 credits are largely fixed (93%) by the requirements of the University, College and Department for accreditation. The 30 credit M.S. curriculum has only the Department's 9 credit breadth requirement fixing only 30% of the M.S. curriculum. The rest of the courses can be chosen from all 400, 800 and 900 level across the University. The only limits are that no more than 9 credits can be outside Mechanical Engineering, and a maximum of 9 credits of 400 level courses can be included. The rest of the decision is left up to each individual student. The ME Graduate Program Office and Research Advisors provide advice, and the program is individually chosen. In fact, there is even more choice at the PhD level.

Requirements	Bachelor of Science (B.S.)	Master of Science (M.S.)
Michigan State University	23-24 credits	None
College of Engineering	29 credits	None
Dept. of Mechanical Engineering	55 credits	None
Other	Senior Electives 12 credits	Breadth 9 credits
Total Requirements	119	9 credits
Total program Credits	128	30
Percentage of Required Courses	93%	30%

You can use the customized program of a graduate degree to get ahead of your professional competition. Use your own custom program to get more in-depth technical experience in the area(s) of Mechanical Engineering that you most want to work in. Approach potential employers with the extra credentials that get you immediately qualified to work on the kind of projects you want most to work on. You can do it.

⇒ Did you know that most MSU graduate students have assistantships providing *full tuition, health insurance and upwards of \$1600/mo in salary?* Come talk to the ME Graduate Program Office about the opportunity.

POSTERS!!! POSTERS!!!

(A short play by Craig Gunn, featuring "Bob" and "Mary")



Bob: Have you seen them?

Mary: What?

Bob: A whole bunch of great research posters.

Mary: Where?

Bob: Second floor – 400 and 500 wing close to the ME office

Mary: Why?

Bob: They represent a lot of graduate student research and a neat poster competition! Along with that it has given me an idea to talk to **Dr.Radcliffe** about Graduate School.

Mary: Good idea! I think I'll stop and take a look. See you in Dr.Radcliffe's office.

English in the Future?

by Craig Gunn

As the text messaging generation moves forward in life, one might think about what is going to happen to the language that we grew up with, learned in school, and cultivated in our own relationships with others. Does everything get boiled down into abbreviations; cut down sentences; removed punctuation; and, for some, language as difficult to understand as some foreign dialects? For engineers, there is brewing a dilemma that may require some real thought and soul searching.

Engineers are a group of people to whom the world turns for both improvements in life and solutions to problems that plague society. Engineering is a profession of clarity and exactness. For the engineer to be sloppy and produce text that may carry various meanings, which can for a variety of reasons be misinterpreted, there are no multiple paths. What an engineer says must be always interpreted in the same way by all audiences.

Given that we are living in a new time when everyone has a cell phone, everyone converses on a more than regular basis with people all over the world, and everyone feels the need to be concise in what they use as their operational language; we must, on the other hand, sit back for a second and make some critical decisions on what professionals will need to do in order to fulfill their duties to the society for which they were trained to serve.

All the advances in devices meant to help with communication have seemed to open the doors to what is now a truly communication generation. It may well also be a time when the new generation of engineers emerging into this world of communication will need to take the reins of innovation and be forced to keep a check on language that fails to communicate in an exact manner. This may seem to be outside the scope of the

engineer, but with the innovations will come the responsibilities that go with those innovations. Perhaps our newest graduates will become the language protectors of the future. It is not science fiction!

Enroll Now for Summer Semester!

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

- **First Session:** CE 221; ME 361, 391, 410; 491/101; MSE 250, 426; STT 351.
- **Second Session:** ME 180, 201, 222, 471; STT 351.
- **Full Session:** ECE 345; ME 332, 412, 451, 461 and 490.

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

A number of extension courses, including ISS and IAH, will be offered in the Detroit, Flint, and Grand Rapids areas. STT 351 will be available as an extension course in Farmington Hills. In addition, ISS 310 and 315 will be offered online.

The enrollment numbers as of March 24 will be used by the ME department to determine whether there are enough students to offer each course. So, it is in your own best interest to enroll in your summer courses by March 24!

**REMEMBER! LOW ENROLLMENTS
CAN MEAN CANCELLED
COURSES!**

Special Overrides

1) Transfer Override Requests: If you plan to take an the prerequisite for an ME course at another institution this summer, complete a *Transfer Override Request Form*, which can be found at <http://www.egr.msu.edu/me/programs/ugrad/> [Click on TRANSFER OVERRIDE REQUEST FORM]. You will be given a prerequisite override so that you can enroll in the next course in the sequence.

2) ISS 3xx Overrides: Transfer students who transferred their first ISS course will need a prerequisite override before enrolling in ISS 3xx. Prerequisite overrides for ISS 3xx will be available in 302 Berkey Hall on Monday-Friday at 8:30-11:00 a.m. and 1:00-4:00 p.m. **IMPORTANT:**

• **Be sure to take your transfer credit evaluation with you.**

• **Be prepared to tell them the course number and section you are requesting.**

3) 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, complete the ME Override Form on the ME website. Select "Other" for Reason for Request and write that you are taking ME 412 concurrently with ME 410 this summer.

College of Engineering Scholarships

The 2006-2007 College of Engineering Scholarship application is available at:

<http://www.egr.msu.edu/egr/programs/bachelors/scholarships.php>

Students with a 3.5+ GPA are encouraged to apply.

HURRY! The Deadline is March 17.

Spring 2005 Dean's List

Congratulations to the following 170 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 on February 27 from the Registrar's official website (<http://www.reg.msu.edu/ROInfo/GradHonor/DeanList/DeanList.asp>).*

Kathryn Anderson, Andrew Armstrong, Nicole Arnold, Sameer Ashaibi, Muhammad Aslam, Melanie Badgley, Michael Balck, Timothy Baumer, Jeffrey Bazzi, Matthew Beacom, Logan Beam, Nicholas Beechnau, John Benghauser, Christopher Bibby, Jesse Black, Lindsay Bockstiegel, Neil Bokemeier, Agatha Bone, Jerrod Braman, Adam Brannan, Matthew Burdick, Christopher Caffee, Melissa Carrier, Daniel Cassar, Christopher Cater, Nathan Chase, Joel Cook, Logan Cook, Bryan Cooper, Kaid Cousineau, Amanda Danielson, Brandon Dawson, Mitchell Dejonge, Kenneth Delia, Pinal Desai, Scott Dosson, Chelsea Eble, Christopher Erwin, Michael Farrington, Jordan Fountain, Jason Franklin, Teresa Franklin, Nobuyuki Fujiwara, Michael Fullerton, Gregory Gartland, Steven Gerrish, Daniel Gipper, Chad Glinsky, Nurit Golenberg, Jonathan Gould, Blake Gower, Brandon Gulker, Chan Ha, Patrick Hammer, Matthew Hartman, Andrew Hartsig, Michael Hass, David Heckel, Zachary Heidemann, Richard Henderson, Michael Hines, Jeremy Horgan, Robert Huehl, Thomas Hull, Richard Humphries, Eric Johnson, Jillian Joliat, Brian Justusson, Zachary Kaltz, Megan Kelley, Brandon Kelly, Ryan Kelly, Shawn Klann, Chad Kleinow, David Klipfel, Jacob Kloss, Kyle Koepf, Joseph Kondratek, Peter Kopinski, Andrew Kosinski, Lindsay Kredon, Matthew Lassiter, Allison Lewis, Benjamin Lindstrom, Daniel Little, Benjamin Llewellyn, Carl Luyendyk, Armon Mahajerin, Dustin Manning, Matthew McCartney, Margaret McHale, Kevin McKay, Michael McKimmy, Brielle Meadows, Christoph Miller, Kevin Miller, Viraj Mokashi, Mohd Mokhtar, Ryan Monroe, Mark Mouland, Michael Nicley, Kevin O'Beirne, Basak Oguz, Fernando Oliveira, Thomas Pabst, Kunjan Patel, Gregory Pelkie, Kelly Peterson, Daniel Petlicki, Bethany Pickett, Anthony Piro, Steven Pisarski, Nicholas Potocki, Brian Powell, Kate Presnell, Martin Priess, Stacie Proctor, Heather Pung, John Quackenbush, Megan Raidl, Daniel Raphael, Joy Reichenbach, David Ruddock, Matthew Ryerkerk, Gregory Schafer, Daniel Schleh, Erik Schubert, Michael Schultz, Matthew Schwartz, Logan Scott, Shangyun Shi, Andrew Siefert, Kaija Siljander, Adam Smith, Martha Smith, Ryan Smith, Donald Snyder, Benjamin Souder, Charles Spaniola, Keith Srebinski, Troy Staten, Brian Steffes, Ryan

114 Seniors to Graduate in May and August!

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 February 28. If your name is missing, please contact me immediately (griffiore@egr.msu.edu / 517-355-3338).—Gaile

May Graduates

Jason J Aerts
Rayad Alsarihi
Mohammed A Aseel
Daniel Paul Bak
Joseph B Baldori
Andrew Robert Ball
Benjamin Guy Banworth
Kayla Marie Batchelor
Jeffrey Robert Bazzi
Robert Ian Bell
Christopher Stuart Bibby
Jesse Douglas Black
Chad Andrew Boonyasith
Jerrod Edward Braman
Matthew Robert Carlson
Benjamin David Carpenter
Chet Allen Chamberlin
Nathan Jeffrey Chase
Jeffrey Edward Clemens
Melissa Ann Cole
Daniel Patrick Colleran
Joel Timothy Cook
Logan Michael Cook
Kaid Alexander Cousineau
Amanda Christine Danielson
Michelle Kay Foncannon
Jordan Robert Fountain
Teresa Jean Franklin
David John Gasparovich
Eric Edward Gawel
Steven Michael Gerrish

Daniel Patrick Gipper
Jason Lynn Harrison
Andrew Thomas Hartsig
Bradley Scott Herbeck
Robert Lee Huehl
Richard Allen Humphries
Christine Ann Hunt
Shannon Eileen Hunt
Eric Dale Johnson
Jennifer Nicole Joseph
Dmitriy Kats
Joseph Charles Keech
Michelle Renee Kimball
Shawn Christopher Klann
Erika Kay Kopulos
John Thomas Lankes
Chad Joseph Lindsly
Armon Mahajerin
Daisuke Matsuura
Christopher H Matulis
Matthew Leland McKay
Andrew Magdy-Zakaria Messieha
Gerritt Benjamin Meyers
Pranav Kishor Mokashi
Ryan James Monroe
James Wilson Moore
Nicholas Anton Muntz
Jason Karol Niesz
Kevin J O'Beirne
Derek Douglas Onkka
Sarah A Overman
Bradley John Palazzolo

Richard Michael Patton
Nicole Therese Pawelec
Nicholas John Periat
William Jermaine Perry
Heather Lynne Placek
Nicholas Adam Potocki
Jeffrey Michael Prevost
Caryn Diane Pytleski
John Charles Quackenbush II
Marcus Rademacher
Megan M Raidl
Nathan Robert Remsberg
Alan Michael Rhodes
April Dawn Richardson
Eric Kurt Rinker
Matthew Charles Rivers
James Matthew Rogers
Michael Paul Schultz
Ryan Steven Shannon
Kaija Marie Siljander
Seung Ryul Song
Ryan William Stanko
Derek Abram Strittmatter
Dennis Joseph Suminski II
Ibrahim Sy
Derek Ronald Thelen
Eric Peter Truskoski
Marco Vagani
Erica Marie Villegas
Kristopher John Villegas
Bethany Ann Wenzel

August Graduates

Jonathan Clay Bendert
Jonathan Robert Carter
Grace Elizabeth Fitzpatrick
Nobuyuki Fujiwara
Kamal Bader Hasan
Aaron Roman Huber
Ashley Ann Jones

Mary Margaret McCullen
Michael Thomas McDonnell
Allison Anne Mendel
Shawn Michael Miller
Christopher Steven Miltz
Daniel Ronald Mutschler

Okechukwu I Okoro
John Bola Oloyede
Jason Anthony Peabody
Michael Paul Schultz
Brett Joseph Smith
Jeffrey Thomas Steele
Nathan Patrick Zeigler



Stull, Christopher Sweeney, Kyle Szykiel, Jin Tam, Keith Tenbusch, Timothy Terry, Jessica Theis, Matthew Thurman, Joseph Tideswell, Elliot Tippmann, Eric Truskoski, Marco Vagani, Brendan Vidmar, Nicole Vidro, Bradley Wackerle, Bryan

Wagenknecht, Jacob Wagner, Steven Wagner, Richard Wahl, Ryan Wahula, Kipp Wallace, Shawn White, Pamela Wickersham, Trevor Winter, Matthew Wolf, Alexander Wright, Ashley Wright, Taylor Young

COVER STORY– Dr. Hubbard Reflects on His Life and Work!

When I was nearly graduated with my B.S.M.E. from Duke University in 1965, my department chair asked what I intended to do. I said that I wanted to be an engineer and to design things to help people, a common and broad goal for most engineers. I must admit I was not sure what that really meant.

From Duke, I went to grad school in Theoretical and Applied Mechanics at the University of Illinois where I studied fatigue crack growth for my masters thesis. This led to an interest in failure of metal orthopedic implants, then to bone mechanics, and then to skull bone and head injury for my doctoral research in 1970. At GM Research Labs (1971-77) I worked on injury mechanics, especially for head injury. Among other things, I specified, designed, and developed the head on the Hybrid III crash dummy that is still used today. That was the first thing that I helped design to benefit people.

We (wife **JoAnn** and our twins) came to MSU in 1977 and I joined the



PHOTO BY HARLEY SEELEY

The Steelcase Leap office chair, which Dr. Hubbard helped to design, is their most biomechanically and commercially successful chair ever.

Department of Biomechanics in the College of Osteopathic Medicine, with a joint appointment in the College of Engineering. I set up a lab to measure the mechanical properties of biological tissues, which is now led very ably by **Dr. Roger Haut** (ME Professor and my office mate when we were both at GM). I also started research with Osteopathic physicians on spinal biomechanics and manual medicine.

In the mid-1980's, I had two major opportunities to pursue my interest in design. The first opportunity was when a friend from GM was the head engineer for Johnson Controls Automotive Systems Group. He wanted me to help him make "comfortable seats." I told him that I did not know much about seats but I could tell his engineers what they needed to know about people to design seats that functioned well with people. This led to the development of biomechanical representations and measurements of people for seating design and evaluation, which is still active today under the direction of **Dr. Tamara Bush** (ME Visiting Assistant Professor). We have made major contributions to the design and development of the next generation of manikin that the Society of Automotive Engineers uses to represent people's positions in automobile seating. We have also helped Steelcase design and validate their "Leap" office chair, their most biomechanically and commercially successful chair ever.

The other major design opportunity came in 1982 when my wife's brother, **Jim Downing** (racecar driver and builder), had a racer friend who died of a basilar skull fracture. The friend went off-course and hit a dirt bank. His torso was restrained by his shoulder harness but his head and helmet were unrestrained; they swung forward with enough violence to pull apart the

base of his skull. Jim asked me what could be done. With my background in mechanics of skull bone and crash injury, I invented the HANS® head and neck support.

During the 1980's, I refined the HANS® concept, made early functional prototypes (the first prototype made with duct tape and poster board), and was granted a patent in my name. Because this patent was not based on my work at MSU and was not clearly destined for commercial success, MSU advised me to pursue this patent on my own, which meant that I got to pay for the patent lawyer and development myself. The first crash sled tests ever run in the U.S. for racing safety were those that we ran in 1989 under contract to Wayne State University to validate the HANS®. The performance of the HANS® was so good in reducing head motions, neck loads, and injury potential that I felt obligated to make and sell HANS® devices. After failing to interest racing safety equipment suppliers, Jim Downing and I started a small company to sell HANS® devices because we could have them made in the composites shop that was part of Jim's racing shop.

GM (in 1992), Ford (in 1995) and Mercedes Benz (in 1997) started racing safety programs where they cooperated with medical experts, studied racing crashes, and evaluated safety improvements including HANS®. In 1999 and 2000, several young drivers died with basilar skull fractures. The car companies and racing sanctioning bodies like CART, NASCAR, and FIA began encouraging their drivers to wear HANS® and make other safety improvements. In the 2001 Daytona 500, **Dale Earnhardt** died when his car veered into the wall in the final turn and he suffered a basilar skull fracture. Dale Earnhardt's death shocked the racing world and elevated safety to a very high priority. Since then, HANS® has

been implemented and mandated in virtually all forms of racing.

So, like I said I wanted to do in 1965, I have dreamed up ideas and contributed to products like better seats and the HANS® devices that really help people. When I followed my interests toward product development, I was concerned that I was turning away from traditional academic values of getting grants and

writing papers. But, I had tenure and did it anyway. As it turned out, my product related work was generously supported by industrial sponsors and included basic research that was needed to make technology and product advances.

I am very grateful for my successes in new product development and that MSU has been such an accommodating environment for me to follow my dreams. Maybe my

most significant contribution to MSU is a course in new product conception that is taught with the College of Business with approximately 120 engineering and 80 marketing students. They team up to identify an unmet market need and conceive of a new product with benefits that respond to the unmet need, which is the template for successful creation of new products – what fun!!!

**Michigan State University
Department of Mechanical Engineering**

BIOMEDICAL ENGINEERING OPTION
(16-17 Credits)

The Biomedical Engineering Option is designed for undergraduates who plan to pursue graduate work in a biomedical area or seek employment in selected medical areas. The option, which is administered by the College of Engineering, is available to students who are enrolled in bachelor's degree programs in the College of Engineering.

To complete a Bachelor of Science degree in *mechanical engineering* with a Biomedical Engineering Option, students must complete the requirements for the B.S. degree, including the following 16-17 credits:

- PSL 250 Introductory Physiology—4 credits (Fall and Spring)

Plus one of the following courses:

- BS 110 Organisms and Populations—4 credits (Fall and Spring)
- BS 111 Cells and Molecules—3 credits (Fall, Spring and Summer)

Plus 9 credits from the following list:

•ME 490 Independent Study	1-4 credits (Fall, Spring, Summer)
•ME 491 Selected Topics	1-4 credits (Fall, Spring, Summer)
•ME 494 Biofluid Mechanics & Heat Transfer	3 credits (Fall Only)
•ME 495 Tissue Mechanics	3 credits (Spring Only)
•ME 497 Biomechanical Design	3 credits (Spring Only)
•BME 401 Quantitative Human Biology (<i>see note below</i>)	3 credits (Spring Only)
•MSE 425 Biomaterials & Biocompatibility	3 credits (Spring Only)

CREDIT DISTRIBUTION: PSL 250 will be applied to the Bioscience requirement, and BS 110 or 111 will be applied to Other Electives. The nine engineering credits will be applied to the Senior Elective requirement (*not* the “design intensive” course component, however). Completion of the option will be noted on the final transcript.

NOTE: One of the prerequisites for BME 401 is (ANTR 350 or concurrently).

Aachen Program

by J.F. Foss

The 2006 MSU/ME students are now in Aachen, Germany for their study abroad experience. They are enrolled in the ME 410 (Heat Transfer) course taught (in English) by doctoral candidates of the Heat Transfer Institute. They are also enrolled for the MSU course: GRM 102, taught by an instructor of the RWTH (Technical University of Aachen). In addition, they are also carrying out research with German colleagues for 5 credits of ME 490.

They prepared in the fall semester (2005) by doing 1 credit of ME 490 under the direction of an MSU professor who will also assign their grade for the spring semester.

A flavor of this program can be gained from the following email messages provided by students who are now studying abroad in Aachen:

Ray Gallagher: *"I have met some good people in Germany so far. I have become friends with not only German people but also a group of Russians and Polish kids. Everyone in Aachen is very friendly and sociable and it has been surprisingly easy to meet people. I think the city of Aachen is a great place to be for four months. The alt stadt ("old town") has the classic atmosphere of a European city with university intertwined. Aachen is large enough to enjoy the atmosphere of a city while at the same time it doesn't have the crime rates of a huge European city. We have traveled as a group to a couple of different cities so far. Some of them include Koln, Dusseldorf, Schloss Neuschwanstein, Dachau, Berlin and Amsterdam. We are planning to go to Prague, Paris, Dublin for St. Patrick's day, Rome for Easter weekend, Barcelona, Athens and Munich. We have a smaller group than past study abroad groups and I like it this way. We all get along great and have become close with each other. My institute is going well too and I like the people I am working with. They all treat me with respect and we along well. A couple guys from my institute asked me to come to*



an Aachen alemannia football (soccer) game with them and the rest of the group came with us. It was a great time and the people here love their soccer more then Americans love their football. The food here is also surprisingly good. I thought before coming to Germany every restaurant would serve only bratwursts and sauerkraut but that is not the case. Every corner has a bachei which only serves only freshly made breads and foods and is some of the best I have ever had."

Nicholas Strevel: *"Everything is going great here— the country is amazing. I am currently working on the acoustical design of the 'series' hybrid bus engine. The combustion engine, which is not connected to the drivetrain directly, runs a generator that stores energy in a battery that supplies the electric motors of the bus. There are many interesting advantages of a system like this: The engine runs only at its point of maximum efficiency, the combustion engine is most likely not running when the bus comes to, and leaves it's stops, and various others.*

As for my personal work I am working with software called ITI-SIM, which is very similar to MATLAB simulink, but a little easier to use. Other Ph.D.s have already designed the model which takes into account everything possible in the combustion/drivetrain process. Very Cool. I am running simulations with this model, varying things like piston mass/rotational inertia and stiffness of the crankshaft. All this in an effort to find out the deciding factors causing the overall vibration being transferred to the four engine mounts. Another student is working on a control

system model to possibly send an input to the generator to compensate for the engine vibration, also a unique idea."

Daniel Isaac: *"My decision to study abroad in Aachen, Germany has undoubtedly been the best decision I have made throughout my college career. This program has provided me with life lessons that cannot be taught in the classroom. To date we have traveled to major cities in Germany including Koln, Dusseldorf, Munich, and Berlin. We have literally stood in various historical landmarks including Hitler's Bunker, Dachau Concentration Camp, and the castles of numerous influential leaders. It is one thing to learn history through books; however, it is quite another to actually see the place where history was made. Aside from travel and history this program has also given me the opportunity to gain first hand experience in research. Through the ME 490 research project I have learned a great deal about what it takes to conduct accurate experiments and, more importantly, how to analyze your results. For the remainder of our stay we will continue to make the most of this experience through both the technical education that RWTH has to offer and also through international travel. Some of our future destinations include Rome, Dublin, Paris, Athens, and Prague. The mechanical engineering program in Aachen has been a life changing experience and one that will define my life for years to come. I strongly encourage all who have the opportunity to participate do so, for I am certain your experiences will be nothing short of amazing."*



New Study Abroad Program: Renewable Biobased Energy Systems

Sweden is on the cutting edge when it comes to making environmentally sound decisions about energy use. A recent Swedish Press Release announced the goal to be the first country in the world to become 100% fossil-fuel free by the year 2020! An ambitious goal, to be sure; but they are already well on their way, with nearly one-half of their total energy consumption coming from non-fossil fuel resources, and 20% from biobased resources alone.

That is why a new technical study abroad program has been developed in Sweden by **Dr. Ajit Srivastava**, professor and department chairperson for Biosystems Engineering. The three-week summer program will provide upper-level engineering students an opportunity to learn first hand about Sweden's methods and policies regarding renewable energy. Limited to twelve students, the group will begin studying at the Royal Institute of Technology in Stockholm. They will then travel to southern Sweden to visit the completely fossil-fuel free city of Växjö before reaching their final destination of Simrishamn, a beautiful small city on the coast of the Baltic Sea.

Interest in the energy program has spanned across engineering disciplines—with students accepted from applied engineering sciences, biosystems engineering, chemical engineering and mechanical engineering. All professors and public professionals will speak fluent English, since it is a required second language in Sweden. Therefore, learning Swedish is not at all necessary (but it can be fun to learn some basic phrases while there). This summer should prove to be a very rewarding experience for everyone participating in our premier program to *Sverige!* Submitted by *Elaine M. Johnson, Sweden Bioenergy Program Coordinator*



Zachary Kaltz: *"It's hard to believe I've been in Aachen for only six weeks. I have met people from all over the world, investigated the freezing characteristics of cryo-cooled cellular storage containers, toured industrial plants in western Germany, and struggled through the language barrier to discover a different culture. It has been an amazing experience; I look forward to what the next few months will bring."*

Matthew McCartney: *"To date my experience in Aachen has been extremely valuable. The design of the program created the opportunity for me to spend time both traveling and studying. Living in Aachen has provided me with the ability to expand my personal viewpoints to include an entirely different side of the world. It has also helped me to further my education and gain experience by conducting research and*

taking classes at another University. I would recommend this program to anyone in the Mechanical Engineering program at MSU."

We are now organizing the 2007 program. The details will be the same as noted above. Students who are considering this life-changing opportunity should contact **Prof. J. Foss** (foss@egr.msu.edu). It is our intent to accept a full slate of participants this spring. Those accepted will be eligible for the ZF Scholarships that provide for summer intern positions with this German based automotive supplier both for 2006 and 2007 plus financial support for their time in Aachen.

Russia Program

by **Elena Y Selezneva**

ME students have a great opportunity to study abroad in Russia during Summer 2006! This University-wide program offers classes from a variety of disciplines. Most relevant to ME majors are the fundamental engineering courses *CE 221 Statics* and *ME 361 Dynamics*, and *STT 351 Statistics for Engineers*. In 2006 students will also be able to take *MTH 234 Multivariable Calculus*, *MTH 235 Differential Equations*, and *MTH 340 Ordinary Differential Equations*.

Students will also have an opportunity to spend the entire summer in Russia and complete an engineering internship. CEE senior and 2005 participant, **Sean M. Fitzgerald**, commented:

"I learned many useful skills that they do not teach in the university and wrote a technical report that I can submit to information technology contests, and also be proud of for years to come."

Students also have multiple options to fulfill their IAH requirements. Two popular choices are *IAH 221(C) Russian Language and Culture* and *IAH 221(C) World War II – The Eastern Front*. This latter course is dedicated to the critical role that Russia played in World War II. Last summer the course was offered for the first time and was a tremendous success. Indeed in 2005, MSE senior Bradley Hall traveled to Russia for the second time and commented:

"IAH 221C (World War II – The Eastern Front) is probably the most interesting and moving class I have taken while at MSU. It was a powerfully somber experience."

Another innovation in this growing program is the unique opportunity for students to visit Prague, the capital of the Czech Republic and one of the most beautiful cities of Eastern Europe.

To learn more contact **Elena Y Selezneva** in CEE (seleznev@msu.edu), as soon as possible. Additional information about the program is available online at <http://www.msuabroadinrussia.com/>. Information is also available through **Dr. Mason's** website at <http://www.albion.edu/mathcs/dmason/russia.htm>.

American Society of Mechanical Engineers



As always, ASME will be offering many events throughout this semester. Along with "The Gathering" at the end of the semester, you can also expect many other student activities or presentations and

demonstrations from companies nation wide. Look for more information about a Freshman/Sophomore speaker panel, a presentation from ME chair **Dr. Eann Patterson**, the IEEE vs. ASME Basketball game, Relay for Life, and many more! Many events with food and drinks provided free to our members.

Student members may attend all ASME events, including our weekly meetings. Members also have access to student loan and scholarship programs that no other student on campus has access to. But one of the best benefits is the chance to network with industry and faculty. Joining ASME can be a great way to get contacts inside the school and at many of the companies in the field of engineering. With job placement becoming more of an issue everyday, joining a student group gives you the competitive edge you need.

It is simple and beneficial to become a member. Applications are available outside the ASME office (2328K EB), and online (www.msu.edu/asme). Membership is only \$30 (freshman membership is free!) and gets you into all presentations. ASME members receive *ASME News* and *Mechanical Engineering* magazine.

Do you want to become even more involved? Would you like your voice to be heard both within the society and college of engineering? Run for office! Come make the most of your MSU education. Helping run an organization like ASME gives you an immense amount of real-world experience and looks great on a resume. With ASME, you can help new programs come to life that will benefit all ME students. To find out how to become a part of the executive board, contact **Robert Huehl**. (huehlrob@msu.edu)

The Michigan State University chapter of ASME is excited to announce that we will be hosting the Midwest Student Leadership Conference this year. From April 7-9, students from colleges all over this side of the country will come to MSU to compete in a student design contest recognized world wide. MSU has always shown well in the past and are hoping for the home court advantage this year. Hopefully MSU can secure another gold medal this year.

Contact Us Visit www.egr.msu.edu/asme for details on meetings, events, membership and more. *Submitted by Tim Locker, Newsletter Editor*

Pi Tau Sigma



Pi Tau Sigma, the mechanical engineering honor society, is very excited about this semester. We've gotten off to a great start. The semester was kicked off with a wing-filled night at Buffalo Wild Wings. We've helped our community by preparing dinner at the Ronald McDonald House and participated in the Science, Engineering, and Technology Day by representing the "Ask ME" team. We also sponsored the Mashed Potato Castle Contest to celebrate E-week.

We are looking forward to the many remaining events this semester. On March 13th we will be socializing over burgers at Crunchy's and bowling on March 23rd at Holiday Lanes. We will be helping our community by volunteering at the Ronald McDonald House on March 18th and helping fight cancer by walking in the Relay for Life on April 21-22. See the Pi Tau Sigma website to sign up to participate or to donate online!

We will be holding Senior Elective night on March 30. This is an excellent time finalize your schedule for next year by listening to the students point of view on all the ME senior elective classes. We will also have members speak to children at Design Day on April 28th in the Union. Our biggest event each semester, the Golf Outing open to all mechanical engineering students, tees off on April 15. The structure of this event has changed from last semester and we are including ME recruiters as well. For more information about any of our events, please check out our website at www.egr.msu.edu/pts. We hope to see you at our upcoming events! *Submitted by Kayla Batchelor, Secretary.*

The 2006 Pi Tau Sigma Spring Golf Scramble



Open to all ME students!
Saturday, April 15, 2006
Forest Akers East Golf Course
10:00 a.m. Start



Network with people from industry!
Get a job or internship by playing one game of golf!

The fourth member of every team will be from a successful engineering company. Confirmed companies include: Accenture, Daimler Chrysler, Dow Chemical and more!

\$20 per golfer (Includes: 18 holes, cart, and picnic lunch)

Many contests and prizes! Pre-register teams of three, or register as an individual and network with new people. For more information or to register, please contact Jon Bendert at bendertj@msu.edu or visit the Pi Tau Sigma website at www.egr.msu.edu/pts/

All teams must register and pay by April 3, 2005 at 9 a.m.

MSU Baja Racing



The MSU Baja team is gearing up for their annual competitions, this year traveling to Auburn, Alabama; Milwaukee, Wisconsin; and Portland, Oregon.

MSU Baja is a Society of Automotive Engineers competition that challenges teams to design, build, test, promote and race a single-person off-road vehicle. Three annual competitions test student knowledge in design, cost, sales and production events. Competition also includes dynamic events: Acceleration, Maneuverability, Hill Climb, Sled Pull, Mud Bog, Rock Crawl and Endurance.

In 2005, the team entered two vehicles in two competitions, placing 18th and 29th out of 131 teams, in Tucson, Arizona; and 16th and 47th out of 141 teams, in Troy, Ohio. Highlights of the 2005 season include a 3rd place in maneuverability, 5th place in sales presentation and 4th place design score.

For 2006 the team, led by seniors **Tim Locker** and **Pete Schupska**, will return to the amphibious East Competition for the first time since 1997. The East Competition creates a new set of design challenges, requiring the car to float and propel itself in water. The 2006 vehicles will build off the success of previous years while incorporating newly designed components such as a unique trans-axle driveline, a refined double A-arm suspension, and innovative gages cluster. With a large returning team, and a record of success, the MSU Baja Team is looking forward to another terrific year.

More information? <http://www.egr.msu.edu/baja> or email: lockerti@msu.edu. Submitted by *Tim Locker, Project Manager*



PHOTO PROVIDED BY SAE BAJA

Formula SAE 2005



The MSU Formula Racing Team has been working hard over the fall semester and is now virtually completed with the 2006 MSU racecar #41.

Winter break was one of the most successful ever for the team, with most team leaders working close to every day. In fact, the team is happy to report that approximately 95% of the chassis was fabricated in less than five days.

In addition to completing the design and fabrication of racecar #41, the team has been participating in several external events. The team is honored to be the first Formula SAE team in history to participate in the North American International Auto Show, the largest auto show in the nation. Team members received many good questions and comments from visitors, and racecar #107 and #41 were the subjects of many photographs. During the charity preview, the team was visited by **Governor Jennifer Granholm** and her son **Jack**, who received a picture of himself sitting in racecar #107.

The team's hard work paid off by getting racecar #41 running in time for Spring Break-in at longtime hosts University of Florida. Testing this early for driver training and racecar set-up is a huge advantage for Formula SAE teams located in cold climates.

For more information about the *MSU Formula Racing Team*, please contact **Adam Zemke**, *Project Manager*, at zemkeada@egr.msu.edu. Submitted by *Adam Zemke, Project Manager*.



PHOTO PROVIDED BY SAE FORMULA

ME Senior Electives for 2006-2007

- The following ME Senior Elective list, including instructor assignments, was accurate as of March 6, 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>
- 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

- ME 491 **Refrigeration.** Section 101 ONLY. 3(3-0). Requires Override→See GENERAL INSTRUCTIONS in box. Prereq: ME 410 or concurrently. **Description:** Refrigeration systems, including vapor-compression, absorption, and thermoelectric; the major components of refrigeration systems (heat exchangers, compressors, and expansion valves) and how to select them to achieve a specified refrigeration system performance. Practical issues, such as pressure switches, lubricants, and piping systems, will be addressed. *Mueller.*
- ME 490 **Independent Study.** 1-4 credits. Requires Override→See #1 in box. You may reenroll for a maximum of 6 credits.
- MSE 426 **Introduction to Composite Materials.** 3(3-0). Prereq: ME 222. *Lucas.*

FALL SEMESTER

- ME 416* **Computer Assisted Design of Thermal Systems.** 3(4-0). Prereq: ME 410 or concurrently. *Somerton.*
- ME 422 **Introduction to Combustion.** 3(3-0). Prereq: ME 332 or concurrently. *Wichman.*
- ME 423 **Intermediate Mechanics of Deformable Solids.** 3(3-0). Prereq: ME 222. *Loos.*
- ME 425 **Experimental Mechanics.** 3(2-3). Prereq: ME 222. *Cloud.*
- ME 440 **Aerospace Engineering Fundamentals.** 3(3-0). Prereq: ME 332 or concurrently. *Somerton.*
- ME 444 **Automotive Engines.** 3(3-0). Prereq: ME 410 or concurrently. *Schock.*
- ME 456* **Mechatronic System Design.** 3(2-3). Prereq: ECE 345, ME 451 or concurrently. *Radcliffe.*
- ME 465* **Computer Aided Optimal Design.** 3(3-0). Prereq: ME 471 or concurrently. *Díaz.*
- ME 477 **Manufacturing Processes.** 3(3-0). Prereq: ME 222 & MSE 250. *Hinds.*
- ME 486 **International Networked Teams for Engineering Design (INTEnD).** 3(2-2). Prereq: ME 371. **Restriction:** Student who have received credit in EGR 475 may not take this course. *Lloyd/Hinds.*
- ME 490 **Independent Study.** 1-4 credits. Requires Override→See #1 in box. You may reenroll for a maximum of 6 credits.
- ME 494 **Biomechanics and Heat Transfer.** 3(3-0). Prereq: ME 410 or concurrently. **BME Option Course.** *Wright.*
- CHE 472 **Composite Materials Processing.** 3(2-3). Prereq: ME 332. *Jayaraman.*
- ECE 415 **Computer Aided Manufacturing.** 3(2-3). Requires Override→See #2 in box. Prereq: ME 451. *Xi.*
- MSE 451 **Microscopic & Diffraction of Materials.** 3(2-3). Prereq: PHY 184. Recommended background: MSE 350 & 381. For more info→See #3 in box. *Bieler or Crimp.*
- MSE 454 **Ceramic & Refractory Materials.** 3(3-0). Prereq: PHY 184. Recommended background: MSE 350 and 381. For more info→See #3 in box. *Case.*
- MSE 476 **Physical Metallurgy of Ferrous & Aluminum Alloys.** 3(3-0). Prereq: MSE 250. Recommended background: MSE 310 and 360. For more info→See #3 in box. *Crimp.*
- ME 802 **Advanced Classical Thermodynamics.** 3(3-0). Requires Override→See #4 in box. Prereq: ME 412 plus GPA of 3.5+. *TBA.*
- ME 812 **Conductive Heat Transfer.** 3(3-0). Requires Override→See #4 in box. Prereq: ME 412 plus GPA of 3.5+. *Jaberi.*
- ME 830 **Fluid Mechanics I.** 3(3-0). Requires Override→See #4 in box. Prereq: ME 332 (ME 432 recommended) plus GPA of 3.5+. *Koochesfahani.*
- ME 860 **Theory of Vibrations.** 3(3-0). Requires Override→See #4 in box. Prereq: ME 461 plus GPA of 3.5+. *Feeny.*

SPRING SEMESTER

- ME 417* **Design of Alternative Energy Systems.** 3(3-0). Prereq: ME 410 or concurrently. *Somerton.*
- ME 432 **Intermediate Dynamics.** **CANCELLED** (3(3-0)). Prereq: ME 332. *Foss.*
- ME 442* **Turbomachinery.** 3(3-0). Prereq: ME 332. *Mueller.*
- ME 445* **Automotive Powertrain Design.** 3(3-0). Prereq: ME 444. *Novak.*
- ME 457 **Mechatronic System Modeling and Simulation.** 3(3-0). Prereq: ME 451 or concurrently. *Rosenberg.*
- 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 & MSE 250. *Loos.*
- ME 478 **Product Development.** 3(3-0). Requires Override► See #5 in box. Prereq: ME 361, 477 & Tier I Writing. *Kwon.*
- ME 490 **Independent Study.** 1-4 credits. Requires Override► See #1 in box. You may reenroll for a maximum of 6 credits.
- ME 495 **Tissue Mechanics.** 3(3-0). Prereq: ME 222. **BME Option Course.** *Haut.*
- ME 497 **Biomechanical Design.** 3(3-0). Prereq: None for ME majors. **BME Option Course.** *Reid-Bush.*
- BME 401 **Quantitative Human Biology.** 3(4-0). Prereqs: CEM 141, MTH 235, PHY 184, PSL 250 or concurrently, ANTR 350 or concurrently. **BME Option Course.** *Paganini.*
- CE 422 **Applied Hydraulics.** 3(2-2). Prereqs: ME 332 and 391. *Wallace.*
- MSE 425 **Biomaterials & Biocompatibility.** 3(3-0) Prereq: PSL 250 or concurrently and MSE 250. **BME Option Course.** *Baumann.*
- MSE 426 **Introduction to Composite Materials.** 3(3-0). Prereq: ME 222. *Liu.*
- MSE 466 **Fracture & Failure Analysis.** 3(2-3). Prereq: MSE 250. Recommended background: MSE 320, 331, and 381. For more info► See #3 in box. *Lucas.*
- ME 825 **Experimental Mechanics.** 3(2-3). Requires Override► See #4 in box. Prereq: ME 425 or permission plus GPA of 3.5+. *Cloud.*

OVERRIDE INFORMATION

GENERAL INSTRUCTIONS: The ME Override Request Form is located at: <http://www.egr.msu.edu/egr/programs/bachelors/overrides.php>. Please note that the ME department cannot overfill required courses to resolve conflicts with Senior Electives, Other Electives, Integrative Studies courses and employment schedules. The following numbered instructions are referenced in the Senior Elective listings on this and the previous page:

- ① 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 pages, return the form to the ME Advising Office for the remaining signatures, override, and enrollment.
- ② Six seats in ECE 415 have been allocated for MEs who are on record as Manufacturing Option students. If you are one of those students, send an email to Gaile (griffore@egr.msu.edu) and request your override. Be sure to include your PID number and mention that you are on record as a Manufacturing Option student. (To be “on record,” you must meet with Gaile to plan a long-term schedule.)
- ③ ME majors do not need to take the Recommended Background courses, but there will probably be a need for some additional background reading. Contact the professor for more information.
- ④ Complete the *Graduate Course Override* form, available in the ME Advising Office in 2560 EB. This is a paper form. NOTE: Instructor assignments for some ME graduate courses were not available at press time, but should be available in May.
- ⑤ ME 478 is restricted to MSE and ME majors. Priority for ME 478 is given to MEs who are on record as Manufacturing Option students. (To be “on record,” you must meet with Gaile to plan a long-term schedule.)

Spring Semester Calendar

March 13-24	Scheduled appointments for Computer/Telephone enrollment for Summer 2006. Your enrollment appointment is posted in StuInfo.
March 17	Engineering Scholarship deadline. See ad on page 6.
March 30	Pi Tau Sigma Event: Senior Elective Night, 7 p.m. in 1145 EB.
March 31	Computer/Telephone enrollment begins for Fall '06 / Spring '07.
April 7-9	ASME Event: Midwest Student Leadership Conference.
April 21	Pi Tau Sigma Event: Golf Scramble. See ad on page 13.
April 21	ASME Event: Spring Tailgate ("The Gathering") at Dr. Somerton's house.
April 28	ME Design Conference in the MSU Union. See you there!
May 1-5	Final Exams.
May 5	University Undergraduate Student Convocation—1:00 in Breslin.
May 7	College of Engineering Undergraduate Commencement Ceremony, 1:30 p.m. in Breslin. Lasts about 2 hours.
May 15-Jun 29	<u>First</u> Summer Session.
Jul 5-Aug 18	<u>Second</u> Summer Session.
May 15-Aug 18	<u>Full</u> Summer Session.
August 10	First Fall 2005 Minimum Tuition & Fee payment due.
August 28	Fall Semester classes begin.
September 1	Application deadline for FE exam in October.



**The 23rd
M.E. Design Day
Friday, April 28th
MSU Union Building**

- >> Competitions
- >> Awards
- >> Presentations
- >> Live Demos



COLLEGE OF ENGINEERING | DEPARTMENT OF MECHANICAL ENGINEERING

Enjoy free food and network with industry reps. Skip 400-level ME classes! (They're cancelled). Come and enjoy an eye-opening time and maybe gain some inspiration!

MICHIGAN STATE UNIVERSITY

Dept of Mechanical Engineering

ME Advising Office

2560 Engineering Building

East Lansing MI 48824-1226