ME Bulletin

Vol. 52, No. 2  ME Advising Office • 2560 EB • 355-3338  Spring, 2015

COVER STORY:
Spartans Go “Shoppin” at MSU! See page 4.

New Junior Seminar!  
New Teaching Faculty and ME Advising Secretary!  
Computational Cardiac Modeling Research!  
2015-16 Senior Electives  

A group of women listen while Laura Gumpper (ME senior and SWE vice president) describes how to operate a lathe at a recent workshop where women learned how to use shop machinery prior to taking their engineering design classes. Read about it on page 4.
New Junior Seminar!!

You asked for it, and here it is!

During the Fall of 2015, a new junior seminar course will be introduced: ME 399-Professional Issues in Mechanical Engineering.

This one-credit seminar style course is a colloquium on professional issues in Mechanical Engineering practice. It will cover professional conduct and ethical behavior in the engineering workplace; practice in professional writing and oral presentation; the global, economic, environmental and societal context of engineering; contemporary issues in engineering; group dynamics and working in teams; and intellectual property.

ME 399 will help prepare you for the professional aspects of your upper level engineering courses, your internship and co-op experiences and your future career.

It will soon be required for all Mechanical Engineering students, but it is being offered this coming Fall 2015 and Spring 2016 on a limited enrollment basis.

Prerequisite: (Tier I Writing) and (ME Junior or Senior standing).

To request an override, submit the ME Override Request form: http://www.egr.msu.edu/me/form/me-override-request

Don’t miss this opportunity to improve your understanding of mechanical engineering practice!
112 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 March 6. If your name is missing, please contact me immediately at griffore@egr.msu.edu (Tel: 517-355-3338).—Gaile

Reema Ali Al Dhaneem
John Daniel Cereals Alocilja
Zachary Eric Averill
Eric Ryan Bambach
Angela Rose Bertolini
Kevin Delano Betts
Stephanie M Black
Alexander Louys Bonnen
Evan Jefferson Bryant
Toby John Buckley
Michael William Campbell
Benjamin Kendall Drew Carruthers
Jinbo Chen
Yuhao Chen
Michael Andrew Cieslik
Travis Ryan Collings
Austin Wendell Condra
Kyle J Corey
Austin Wendell Condra
Kevin Vincent Licata

May Graduates
Matthew Joseph Heimonen
Jay Steven Heribaca
Trenton Lamar Hicks
Alex Matthew Hock
Aidan Alexander Hunter
Ryan Scott Jacobs
Tyler Daniel Jezowski
Xue Jiang
Trent Thomas Johnson
Noelle Diane Kahunguba
Yousib Brandon Kamo
Ravin Simone Kelser
Joseph Kim
Connor Michael Koester
Jacob Paul Kramer
Anthony James Lacross
Tianlun Liang
Benjamin Thomas Lindemulder
Gregory Robert Lott
Jeremiah Lentin Manning
Stephen James Marshall
Arric Ervin McLauchlan
David Blugerman Miller
Anna Marie Nham
Evan Andrew Nordquist
Ryan Anthony O'Sullivan
Travis J Packer
Bansari Naresh Patel
Cody Joseph Paupert
Shannon Rebecca Pinner
Adam Warren Polack
Ashley Elizabeth Pomaville
Travis Jackson Reinhart
Grant Alan Ridley
Madeline Kelsey Roe
Seth Alan Rohr
Alexander James Schuen
Christopher Uwe Sehling
Kyle James Sherman
Megan Sara Simpson
Manmit Singh
Jacob Adam Sparks
Dane L Sippelman
Lucas Theo Steele
Thomas Joseph Stevenson
Hunter Dean St Pierre
Kuan Ying Tao
Nicholas David Theis
David Jackson Thomas
Mariya V Titova
Geoffrey Mavian Todd
Austen Edward Trethewey
Maraih Marisa Truttling
Steven Ellis Utz
Kevin Benjamin Viguilla
Ryan Elijah Volkman
Ethel Dale Welzbacker
Mitchell Carter Williams
Barrett Matthew Winrick
Tong Wu
Chunlei Zhao
Pengjie Zhuang
David Matthew Zilinskas

August Graduates
Adam Hausbeck Lyman
Bradley James McCauley
Duan Ni
Brandon C Ogbonnaya
Daehye Park
Eric William Peters
Alexander Joseph Primeau
Saurabh Sinha
Travis Nathan Tehlirian
Stephen Gregory Town
William Samuel Weiland
Daewoong Yang

Academic Advising

1) **ME Juniors and Seniors** are advised by Gaile Griffore. For an appointment, call 517-355-3338, or go to 2560 EB.

2) **ME Sophomores with a 3.0 or higher GPA who will be juniors at the end of this semester** are advised by Gaile Griffore. For an appointment, call 517-355-3338, or go to 2560 EB.

3) **ME Sophomores** who do not fit the criteria in number 2 above are advised by Colleen McDonough. To schedule an appointment with her, call 355-6616 x 2.

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

Department News

• **Dr. Assaad Awad Alsahlani** has joined the ME department as an academic teaching specialist. Dr. Alsahlani received his Ph.D. from Michigan State University in 2012. His areas of expertise include vibration control of continuous system strings, beams, and membranes, space structures and deployable systems, inflatable annulae, energy dissipation, nonlinear dynamics and vibrations, vehicle dynamics and stability, design of optimal control systems, and nonlinear control systems. This semester he is teaching ME 371 and 451. In his spare time Dr. Alsahlani enjoys drawing pencil sketches of people.

• **Dr. Christopher Paul** has joined the ME department as an academic teaching specialist. Dr. Paul received his Ph.D. from Michigan State University in 2014. He has worked for Eaton Corporation in Illinois, taught high school science in California, and taught English as a foreign language in Germany. He served as a Peace Corps volunteer in Guinea West Africa in 2004-06. This semester he is teaching ME 201 and 332. In his spare time Dr. Paul enjoys fixing and modifying his car.

• **Ms. Jamie Lake** has joined the ME department as our new undergraduate secretary. Jamie comes to us from Residential Housing Services Payroll in the MSU Union Building where she worked for almost three years. She and her husband have two sons. In her spare time, Jamie enjoys hunting and fishing and reading.

Michigan State University
Vice President of the Society of Women Engineers, Laura Gumpper (ME senior), and Dr. Tamara Reid Bush (ME assistant professor) hosted a workshop for women engineers in the machine shop. The primary goal of the event was for women to learn how to use the machinery and to become familiar with the shop environment prior to beginning their design classes. The event included shop safety training as well as hands-on work with the drill press, band saw, lathe and mill.

Stephanie Black (ME senior) and Lucia Delvillano (ME junior) also assisted in the workshop training, with Lucia providing instruction on the band saw and Stephanie leading the mill work.

Over 20 women attended the event. Four stations were formed so that attendees received exposure to the most commonly used machinery in the shop with small groups of women at each station. Bush, Black, Gumpper and Delvillano provided an overview of safety concerns for their specific piece of equipment, conducted a demonstration, and then mentored each of the attendees as they ran the equipment.

Feedback on the event was positive, with comments such as “I was comfortable asking questions and liked the small group instruction” and “I now have a solid basis to begin my design class builds in the shop.” With such a successful first event, we anticipate it will be held again in the future for students who desire to gain more experience in the machine shop. Special thanks go out to Roy Bailiff, Mike Koschmider and Ken Barlage who stayed late to keep the shop open for the event and conduct the general shop safety portion. Also, thanks to Judy Cordes and Pat Mroczek for helping advertise the workshop.

We would also like to thank all the participants of the “shoppin’” event!
**Curriculum News**

**Co-op Students:** Before you leave for your Summer or Fall 2015 co-op rotation, please be sure to discuss your schedule for next Fall 2015 / Spring 2016 with your academic advisor.

- **ME 399/001–Junior Seminar** (1 credit) will be offered both Fall 2015 and Spring 2016. For more information, see page 2.

- **ME 481–ME Design Projects** requires *department approval* before you can enroll. If you have an accurate long-term schedule on file in the ME Advising Office, request approval by submitting the ME 481 Approval Form: [http://www.egr.msu.edu/me/form/me481-approval-form](http://www.egr.msu.edu/me/form/me481-approval-form). If you do not have an accurate long-term schedule on file, schedule an appointment with Gaile by calling 355-3338 or stopping by 2560 EB. NOTE: May and August graduates who have completed ME 471 and are at least concurrently enrolled in ME 410, may be eligible to take ME 481 during fall semester. Ask Gaile if you qualify.

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

- **ME 491/001–Intro to Computational Fluid Dynamics** (3 credits) will be offered Spring 2016 as a *non-design intensive Senior Elective.* It will taught along with graduate students who will take the course as ME 840, and who will have different assignments. For more information, see page 15.

- **ME 491/602–Humanitarian engineering** (3 credits) will be offered Fall 2015 as a design intensive Senior Elective. For more information, see page 15.

**Engineers and Their Words**

_by Craig Gunn, Director of Communications_

The various media, while purporting to “tell the truth” have chosen instead to bend information to fit the desires of this cause or another. They will all say that the information that they are presenting explains exactly a situation and therefore must be believed. This is the essence of professionalism. I would hope that that would be the case, much as I need to believe that anything that you ascribe to be a professional engineer also adheres to the facts.

I do not want to hear, “The bolts could be somewhere between 2 inches and a foot, but who cares.” I do! Especially if that vaguely described bolt doesn’t do its job and my plane crashes! In the world of communication, we sometimes fail to realize that words are not simply words; they carry an enormous power to spur on the truth but also to be equally powerful in presenting information that is completely false.

Case in point: Since last summer there have been a number of shootings across the country, an occurrence that should be removed from our daily lives. The interesting thing is the way the media portrayed one of the events. A variety of newscasters reported: Bob was shot. Bob was killed. Bob was gunned down. Bob was murdered. Bob was massacred. Are they really saying the same thing? Now add an exclamation point to any or all of these and read the same “Bob was...” and suddenly you change the whole meaning of the words. Emotion takes over and the listeners or readers start to interpret on their own and speculate what the “truth” really is. This speculation does not always lead to anything near the truth.

Engineers have to approach their work with a firm and lasting foundation in truth.
Department of Mechanical Engineering

Dean’s List

Congratulations to these 360 ME majors who made the Dean’s List after Fall 2014. To be on the Dean’s List, you must have a semester GPA of 3.5 or better. This list is from January 30. For updates, go to: http://www.reg.msu.edu/ROInfo/Grad-Honor/DeansList.aspx


MSU-RWTH-Aachen Program by Prof. Brian Feeny, Program Director

Wanna get away? Consider a foreign exchange program. If you are interested in a summer experience where you can work on an applied engineering project in an advanced facility, tour fascinating sites, savor European foods and beverages, soak in the ambiance of languages and culture, and meet new people, check out the exchange program with RWTH Aachen.

MSU ME students with a 3.0 GPA or higher have the amazing opportunity to 1) live in Aachen, Germany (mid-May to end of July 2016), 2) earn 5 credits independent study plus 4 credits German language and culture, and 3) travel in Europe with planned 3-day weekends. The experience will involve interaction with fellow engineering students from around the world at RWTH-Aachen, a premier European technical university. The city center is a blend of an old, historic European city and a modern college town. The superb rail system allows our students to easily reach Munich, Paris, Amsterdam, Zurich, Rome, and many more destinations on their 3-day weekends. Scholarship funds are available through the North American Rockwell Endowment.

Please feel free to talk to former students! They enjoy sharing their experiences with the program, and are excellent sources of information. Former Aachen exchange students can be reached through me or Professor John Foss, our retiring Program Director.

As Professor Foss winds up his final year as the Program Director, this is a good moment to recognize his outstanding, dedicated, and decorated service in building and directing the Aachen Program over the past 32 years. Thank you Dr. Foss!

Watch for the Aachen Program’s 2016 organizational meeting, or contact me at feeny@egr.msu.edu or 353-9451. Don’t miss this opportunity!
Study Abroad at the University of Edinburgh
by Gaile Griffore & Craig Somerton

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

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

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

You will be able to take courses that fulfill your entire Senior Elective requirement (i.e., 12 credits of Senior Electives, including the 3-credit design intensive course). For more information, contact Gaile Griffore, ME Advisor, 2560 EB, 517-355-3338 (griffore@egr.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. Students can take the equivalent of ME 201 or ME 410, both taught in English. They 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)

ME Students Receive Awards

Congratulations to the following ME students who were honored at the annual Evening with Industry Awards Banquet on February 25! The names of those receiving high achieving student recognition are italicized on the Dean’s List on page 6.

Outstanding WIE Member Awards:
- Laura Gumpper (ME Senior), presented by Fiat Chrysler Automobiles.
- Waither Chege (ME Junior), presented by Kautex Trxtron.

Outstanding Society of Women Engineers Award:
- Jennifer Jones (ME Senior), presented by Eaton Corporation.

Outstanding Diversity Programs Award:
- Michelle Samalik (ME Junior), presented by Ford Motor Company.
- Anthony Davis (ME Freshman), presented by Union Pacific Railroad.

Leslie L. Leone Cooperative Education Award for Excellence:
- Kevin Licata (ME Senior).

Frank J. Hatfield “Build it Better” Award:
- Evan Paupert (ME Sophomore).

Exceptional and Distinguished Service Awards:
- Reema Al-Dhaneem (ME Senior), nominated by Drs. Thomas Wolff & Wei-Liao.
- Laura Gumpper (ME Senior), nominated by Jennifer Jones (ME Senior) & Maggie Blair-Ramsey.
- Jennifer Jones (ME Senior), nominated by Laura Gumpper (ME Senior).

Tutoring

- The ME Learning Center, located in 1239 EB, has mentors for ME 201, 222, and 361. The hours for Spring 2015 can be found here: [Click on drop-in hours]
- The Guided Learning Center (GLC), located in 1108 EB, offers free drop in tutoring for MTH 234 and 235 and many core engineering courses. To request assistance, go to: [Scroll down to REQUEST ASSISTANCE]
- The Cornerstone & Residential Experience (CoRe) program provides tutoring in G24 Wonders Hall in courses required for admission to the College of Engineering. Their “drop-in” hours are Sunday through Thursday from 6 - 10 pm.
- ME graduate student and Pi Tau Sigma undergraduate tutors can be contacted through the ME Advising Office. These tutors charge a fee, which you can negotiate with them. If interested, email Gaile Griffore (griffore@egr.msu.edu)
The heart is essentially a complex biological pump whose main purpose is to circulate blood within the body. For the pump to work optimally, however, all involving mechanisms must work in a coordinated fashion. The key mechanisms (physics) involved in the heart’s cyclical pumping action are 1) conduction of electricity (cardiac electrophysiology), 2) contraction of the heart muscles upon stimulation with the electrical signal (solid mechanics) and 3) ejection of blood out of the heart chamber and the subsequent filling of blood in the chamber before the next contraction cycle (fluid mechanics). The failure and/or dis-coordination of one of these three mechanisms would result in a dysfunctional heart, which is often the case in heart diseases.

When compared to the traditional engineering areas, computational modeling of the heart is still in its infancy. This is primarily so because living organs, unlike engineering materials, have highly complex microstructure and can have geometry and mechanical behavior that evolves with time. Moreover, the inherent difficulties in performing experiments on living cardiac tissues make it difficult to quantify its mechanical behavior – a necessary step in the developing realistic computational heart models.

My research interest is in the development of realistic and predictive computational heart models, and using these models to understand the mechanisms and predict the effects of heart diseases and treatments. One current research focus is on modeling the acute and chronic response of heart diseases and therapies. Due to the onset of diseases, the heart typically grows and become bigger, a process known by the clinicians as remodeling. In the event of a heart attack or myocardial infarction (MI), the coronary arteries that supply oxygenated blood to the heart muscles are occluded. As a result, the muscles die and are replaced by a non-contracting fibrotic scar tissue called an infarct. To understand the mechanisms behind MI, we have constructed animal-specific and patient-specific MI heart models from magnetic resonance images that were calibrated with experimental/clinical measurements. One key feature that was reproduced by these models is that the mechanical strain that is close to the infarcted region is abnormal. Specifically, in those regions, the tissues are stretched by the adjacent contracting tissues (Figure 1). Continuous abnormal loading at regions close to the infarct can cause the heart to grow and remodel, a long term chronic response that takes days, months or even years. As a result of this remodeling process,
the heart typically becomes enlarged, spherical and inefficient. The efficiency of the heart is usually quantified by the clinicians as ejection fraction, which is the ratio of the volume of blood ejected out of the heart to the largest volume of the left ventricular chamber in a cardiac cycle. Without intervention, remodeling of the heart can persist and the patient’s condition can deteriorate until a point at which the blood pumped out by the heart is inadequate to meet the body’s metabolic demands. Needless to say, a myriad of treatments have been conceived and are developed to attenuate or even reverse the deleterious remodeling process.

In addition to modeling the acute response, we are developing a computational model that is capable of predicting the long term response of heart diseases. The model is able to predict some key features that were observed during the remodeling processes. These features include the heart left ventricle becoming more spherical and its corresponding pressure-volume loop shifting towards the right (Figure 2). In addition, we are applying these chronic computational models to study the effects of heart failure therapies. One such therapy is the regeneration of the infarct, which can be achieved by the injection of stem cells or by “reprogramming” other cardiac cells (fibroblasts) into myocytes (i.e., heart muscle cells). A number of animal studies have shown that such regenerative therapies can help improve heart function and reverse the remodeling process. We recently tested our model to see if it can reproduce these features by simulating the regeneration of an infarct. The results from our model are promising and we were able to predict some of the features that were qualitatively consistent with those found after treatment with regenerative therapies. Specifically, our model shows the heart becoming smaller and the pressure-volume loop shifting leftward when the infarcted region was revived (Figure 2).

With rapid advances in computing power and medical imaging techniques, computational modeling of the heart will not only play an increasing role in the advancement of our knowledge about heart diseases/treatments, but it is also poised to play an important role in patient care, specifically in customizing and optimizing treatments for individual patients. All in all, computational modeling of biological systems is an exciting frontier with huge potential to be reaped!

[Figure 2: Left: Rightward shifting of the pressure volume curve during remodeling. Top-left inset shows the prescribed infarct and a borderzone region with depressed contractility. Middle inset shows the dilated left ventricle (red) superimposed onto the original one (grey). Right: leftward shifting of the pressure volume curve during reverse remodeling after the infarct is regenerated.]

PHOTO PROVIDED BY DR. LEE
SAE Formula

Michigan State’s Formula SAE Team has been hard at work building this year’s car. Over winter break, the team spent long hours at the shop manufacturing and preparing for final assembly. Although a lot of work still lies ahead for the team, they have made a significant amount of progress.

The team is eager to begin final assembly and eventually test the car. They have already registered for both the Michigan and Nebraska competitions. Competition lasts four days and consists of both static and dynamic events that judge the team and vehicle’s design, manufacturability, cost effectiveness, and marketability. Last year the team placed 6th overall at the Nebraska competition out of 80 universities from around the world.

In January the Formula Team was on display at the North American International Auto Show for the 8th consecutive year. This was a great opportunity to bring attention to the team and the university as a whole.

The Formula Team is funded entirely through donations. Please support them in any way possible to continue this invaluable learning experience for engineering students. Donations can be made to the Cloud Endowment for a lasting impact on the team. For more information, visit: www.msuformularacing.com. Submitted by Dan Riggs, Chief Engineer.

American Society of Mechanical Engineers

The MSU Student Chapter of the American Society of Mechanical Engineers is a non-profit student organization, the main purpose of which is to introduce MSU students to the world of engineering. The Chapter provides a great opportunity for students to meet representatives of leading industrial companies, allowing students to learn about these companies and about possible internship and employment opportunities.

In Spring 2015, ASME will be hosting various informational sessions and bringing in different companies for presentations. These sessions are a great way to meet company representatives and let them learn about you. These interactions with professional engineers, some of whom are MSU alumni, are a great starting point for building your professional network. These events along with a few social events provide the opportunity to mingle with your fellow engineering students and get involved with them outside of the classroom. This semester ASME will also be hosting our JunkYard Wars event on March 20th. This event is an impromptu design competition where teams of 5-6 students compete against one another.

To learn more about our upcoming events please visit http://www.egr.msu.edu/asme/events.html. If you have any other questions please email paskojoh@msu.edu Submitted by John Pasko, President.
Pi Tau Sigma

The Tau Epsilon Chapter of Pi Tau Sigma, the international mechanical engineering honor society, has begun the Spring 2015 semester with the hopes of continuing its efforts in bolstering and incentivizing membership within its elite ranks. Along with the typical initiation processes and gatherings, Pi Tau Sigma members helped with Engineering Expo. Pi Tau Sigma members are looking forward to participating in the Whitehills Science and Engineering Festival on March 19 and volunteering with the Greater Lansing Food Bank on April 4.

Pi Tau Sigma will be hosting a Mechanical Engineering Senior elective presentation on Monday, March 30 at 7:00 pm in 1234 Engineering Building. This event aims to inform students about their ME senior elective options and give them a chance to ask questions from those who have already taken the courses. This will be both fun and informative. All are welcome to attend.

Students in leadership positions in the Tau Epsilon chapter of Pi Tau Sigma are eager to extend the group’s presence within the engineering college, MSU campus, and greater Lansing community. The goal is to ensure a worthwhile experience within the organization as well as provide members with exclusive benefits and opportunities. For more information you can visit the Tau Epsilon chapter’s website at http://www.egr.msu.edu/pts as well as the national headquarters website at www.pitausigma.org. Submitted by Zachary Tuller, President.

Baja SAE

Michigan State’s Baja SAE team has been working tirelessly designing, manufacturing and assembling components for the 2015-racing season. Lead by Evan Boyers, Brad Labaere and Trevor Laskowski, the car looks to be a great one that should do extremely well at the SAE competitions. With the help of their sponsors and hard-working team members, the team plans to have the car assembled and fully tested by the end of spring break.

While most of the car has been completed, there is a lot of work that still needs to be done in order to optimize the car’s performance, like Evan Boyers’ work to optimize the performance and durability of the new gearbox, and Tom Sheldon’s work to have an efficient braking system. The team recently traveled up to Houghton, Michigan to compete in Michigan Technical University’s Blizzard Baja race. This event gives new members some needed experience before the SAE races in Alabama, Maryland, and Oregon. The team took 3 cars to Blizzard Baja and did very well having. The team placed in 5th, 13th, and 18th overall. Submitted by Trevor Laskowski, Project Manager.

PHOTO PROVIDED BYTREVOR LASKOWSKI

Nathan Gill catching some air at the 2015 Blizzard Baja at Michigan Tech
The Center for Spartan Engineering

Located in 1340 EB, across from Sparty’s, The Center for Spartan Engineering is the ultimate resource for engineers seeking guidance on resumes, interviewing preparation, major career events, and experiential education opportunities.

In addition to the everyday consultation activities that take place in The Center, the staff and career peers are active in hosting a variety of career preparation workshops and collaborating with employers for ASK Sessions, Career Fairs, and mock interviews throughout the school year.

At the Engineering Expo, held February 26, the College of Engineering played host to 125 companies and 1,000 students for the 3-hour career event! Engineering Expo has become a can’t-miss event for engineering recruiters nationwide to attract top-talent as well as network and build relationships with students of all majors and years.

The Center wants to congratulate those graduating seniors who have already found and accepted a full-time position. Make sure that you apply for graduation and then complete the Destination Survey and tell us about your upcoming plans! [http://www.egr.msu.edu/careers/feature/destination-survey].

Our unofficial number for 2014 graduates is 94% placement.

For those students still looking for full-time positions, don’t fret. There are still opportunities out there. Make sure that you engage in the following ways to assist in your job search.

• Update your resume and load it on MySpartanCareer.com—there are still employers posting jobs for graduating seniors. Stop into the Center to have your resume critiqued before posting.

• Check the calendar for upcoming events like Employer “ASK” sessions, workshops, mock interviews.

• Network! The U.S. Department of Labor estimates that up to 80% of positions are filled without employer advertising. Networking is important and many are unsure of how to create and use a network. There is a LinkedIn group just for you! Join “Michigan State University Engineering Connection” built to help support and network current and recent Spartan Engineering alumni.

• Join the MSU Alumni Association and start networking with a club in your current town/region or desired destination (i.e. The Chicago Spartans, West Michigan Spartans, Detroit Spartans). They host professional and networking events as well as fun social events.

• Stay persistent and continue to visit us in the Center and allow us to assist you in your search.

All graduating seniors, please join us for the Senior Send-Off on March 25 from 5-7pm in room 1345 EB. There will be food, a talk by Dean Kempel, sessions with recent alumni and companies with valuable advice on “Making the most of your first year”, and a “Last Spartan Lecture” from the Executive Director of the MSU Alumni Association, Scott Westerman.

The Center always has an open door to engineering students and would be happy to help you in any way whether you are at the beginning of your career as a Spartan or preparing to depart the “Banks of the Red Cedar.”

Email: careers@egr.msu.edu
Phone: 517.355.5163

IAH/ISS Diversity Requirement

Each IAH and ISS course emphasizes a form of diversity: national diversity (designated “N” at the end of the course title), international and multicultural diversity (designated “I” at the end of the course title), or both (designated “D” at the end of the course title).

Students must include at least one “N” course and one “I” course in their Integrative Studies programs. A “D” course may meet either an “N” or an “I” requirement, but not both.
The following list of requirements applies to new mechanical engineering program freshmen and transfer students, **BEGINNING Fall SEMESTER 2014 AND THEREAFTER**. Program requirements are changed periodically, and consequently, each student is strongly encouraged to consult with an advisor for academic planning assistance.

**Freshmen**: Go to W-8 Wilson Hall for walk-in advising. **Sophomores**: Call 355-6616, ext. 2 or go to W-8 Wilson Hall. **Juniors and seniors** Call 355-3338 or go to 2560 Engineering Building.

The application for upper school is located at: [https://www.egr.msu.edu/egradmission/](https://www.egr.msu.edu/egradmission/) It is available between the 3rd and 15th week of each semester. Applications are reviewed at the end of each semester after final grades have been posted.

<table>
<thead>
<tr>
<th>DEGREE REQUIREMENTS</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. UNIVERSITY REQUIREMENTS (23)</td>
<td></td>
</tr>
<tr>
<td>Writing (WRA 110-150)</td>
<td>4</td>
</tr>
<tr>
<td>Integrative Arts &amp; Humanities (IAH)</td>
<td>8</td>
</tr>
<tr>
<td>Integrative Social Science (ISS)</td>
<td>8</td>
</tr>
<tr>
<td>Integrative Biol. &amp; Phys. Sci. (ISB/ISP)–See box above</td>
<td>3</td>
</tr>
</tbody>
</table>

| II. COLLEGE REQUIREMENTS (30) |         |
| EGR 100 Intro to Engineering Design | 2       |
| EGR 102 Intro to Engineering Modeling | 2       |
| MTH 132 Calculus I               | 3       |
| MTH 133 Calculus II              | 4       |
| MTH 234 Multivariable Calculus   | 4       |
| MTH 235 Multivariable Calculus II & Differential Equations | 3       |
| CEM 141 General Chemistry I      | 4       |
| PHY 183 Physics for Scientists & Engineers I | 4       |
| PHY 184 Physics for Scientists & Engineers II | 4       |

| III. MAJOR REQUIREMENTS & ELECTIVES (75) |         |
| CE 221 Statics                     | 3       |
| CEM 161 Chemistry Laboratory I     | 1       |
| ECE 345 Electronic Instrumentation & Systems | 3       |
| ME 201 Thermodynamics              | 3       |
| ME 222 Mechanics of Deformable Solids | 3       |
| ME 280 Engineering Graphic Communications | 2       |
| ME 332 Fluid Mechanics             | 4       |
| ME 361 Dynamics                    | 3       |
| ME 371 Mechanical Design I         | 3       |
| ME 391 Mechanical Engineering Analysis | 3       |
| ME 410 Heat Transfer               | 3       |
| ME 412 Heat Transfer Laboratory    | 2       |
| ME 451 Control Systems             | 4       |
| ME 461 Mechanical Vibrations       | 3       |
| ME 471 Mechanical Design II        | 3       |
| ME 481 Mechanical Engineering Design Projects | 3       |
| MSE 250 Materials Science & Engineering | 3       |
| STT 351 Probability & Statistics for Engineering | 3       |

<table>
<thead>
<tr>
<th>MAJOR REQUIREMENTS (Cont’d) CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plus a minimum of 12 credits from the following list of Senior Electives, including at least one design intensive course, designated by an asterisk (*):</td>
</tr>
<tr>
<td>ME 416 * Computer Assisted Design of Thermal Systems</td>
</tr>
<tr>
<td>ME 417 * Design of Alternative Energy Systems</td>
</tr>
<tr>
<td>ME 422 Introduction to Combustion</td>
</tr>
<tr>
<td>ME 423 Intermed. Mech. of Deformable Solids</td>
</tr>
<tr>
<td>ME 425 Experimental Mechanics</td>
</tr>
<tr>
<td>ME 426 Introduction to Composite Materials</td>
</tr>
<tr>
<td>ME 440 Aerospace Engineering Fundamentals</td>
</tr>
<tr>
<td>ME 442 * Turbomachinery</td>
</tr>
<tr>
<td>ME 444 Automotive Engines</td>
</tr>
<tr>
<td>ME 445 * Automotive Powertrain Design</td>
</tr>
<tr>
<td>ME 464 Intermediate Dynamics</td>
</tr>
<tr>
<td>ME 465 * Computer Aided Optimal Design</td>
</tr>
<tr>
<td>ME 475 * Computer Aided Design of Structures</td>
</tr>
<tr>
<td>ME 477 Manufacturing Processes</td>
</tr>
<tr>
<td>ME 478 Product Development</td>
</tr>
<tr>
<td>ME 490 Independent Study</td>
</tr>
<tr>
<td>ME 491 Selected Topics</td>
</tr>
<tr>
<td>ME 494 Biofluid Mechanics &amp; Heat Transfer</td>
</tr>
<tr>
<td>ME 495 Tissue Mechanics</td>
</tr>
<tr>
<td>ME 497 * Biomechanical Design in Product Development</td>
</tr>
</tbody>
</table>

---

Mechanical Engineering students may fulfill an alternative track to the Integrative Studies requirement in Biological and Physical Science (ISB & ISP) by completing one of the following courses: BS 161; ENT 205; MMG 201; PLB 105; **PSL 250**; ZOL 141. (Course in bold has 4 credits.)

---

**Other Electives** 11

**TOTAL** 128
ME Senior Electives for 2015-2016

• The following ME Senior Elective list 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.
• Instructor assignments had not been finalized when the newsletter went to press. They will be posted later on the Schedule of Courses website.
• Course override instructions can be found in the shaded box on page 15.

SUMMER SEMESTER

ME 490 Independent Study. 1-4 credits. See Override Instruction #2 on page 15. You may reenroll for a maximum of 6 credits.
ME 465* Computer Aided Optimal Design. 3(3-0). Prereq: ME 222, and ME 280 plus ME 371 or concurrently. Online Course.

FALL SEMESTER

ME 416* Computer Assisted Design of Thermal Systems. 3(4-0). Prereq: ME 410 or concurrently.
ME 422 Introduction to Combustion. 3(3-0). Prereq: ME 332 or concurrently.
ME 425 Experimental Mechanics. 3(2-3). Prereq: ME 222.
ME 440 Aerospace Engineering Fundamentals. 3(3-0). Prereq: ME 332 or concurrently.
ME 444 Automotive Engines. 3(3-0). Prereq: ME 410 or concurrently.
ME 475* Computer Aided Design of Structures. 3(3-0). Prereq: ME 471 or concurrently.
ME 477 Manufacturing Processes. 3(3-0). Prereq: ME 222, MSE 250, and Tier I Writing.
ME 490 Independent Study. 1-4 credits. See Override Instruction #2 on page 15. You may reenroll for a maximum of 6 credits.
ME 491* Selected Topics in Mechanical Engineering. Section 602: Humanitarian Engineering. See Override Instruction #1 on page 15. Course Description: Extensive class notes plus web-based material, and a major project requiring students to apply human-centered design methodologies to create and manufacture a sustainable solution to an authentic inter-disciplinary engineering problem in India, Guatemala, or Kenya, or elsewhere, involving people fending for themselves at the margins of life. Prereq: (ME 371) and (Senior-level standing).
ME 494 Biomechanics and Heat Transfer. 3(3-0). Prereq: ME 410 or concurrently. Biomechanical Concentration Course.
CHE 472 Composite Materials Processing. 3(2-3). Prereq: ME 332.
ECE 491 Special Topics. Section 601: Acoustics. 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).
MSE 476 Physical Metallurgy of Ferrous & Aluminum Alloys. 3(3-0). Prereq: MSE 250. Recommended background: MSE 310. For more info, see Override Instruction #5 on page 15.
ME 812 Conductive Heat Transfer. 3(3-0). See Override Instruction #6 on page 15. Prereq: ME 412 plus GPA of 3.5+.
ME 830 Fluid Mechanics I. 3(3-0). See Override Instruction #6 on page 15. Prereq: ME 332 plus GPA of 3.5+.
ME 860 Theory of Vibrations. 3(3-0). See Override Instruction #6 on page 15. Prereq: ME 461 plus GPA of 3.5+.
SPRING SEMESTER

ME 417 Design of Alternative Energy Systems. 3(3-0). Prereq: ME 410 or concurrently.
ME 426 Introduction to Composite Materials. 3(3-0). Prereq: ME 222.
ME 445 Turbomachinery. 3(3-0). Prereq: ME 332.
ME 447 Manufacturing Processes. 3(3-0). Prereq: ME 222, MSE 250, and Tier I Writing.
ME 477 Product Development. 3(3-0). Prereq: ME 477 and Tier I Writing.
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. ►This course is taught with graduate students who take the course as ME 840 and have different assignments. If you have questions, contact the instructor.
ME 491 Selected Topics in Mechanical Engineering. Section 603: Automotive Noise and Vibration. See Override Instruction #1 Below. Course Description: Automobiles are one of the most complex and expensive machines that an individual will purchase and use. Vibrations in a vehicle can affect vehicle durability, safety, performance, customer comfort, and even the decision of whether or not to purchase the vehicle. This course will focus on the engineering application of mechanical vibrations to vehicles including: different sources of vehicle vibrations, how these can affect different vehicle systems, driver perception of noise and vibration, and engineering approaches to control vehicle noise and vibration. Prereq: (ME 461 or concurrently).
ME 495 Tissue Mechanics. 3(3-0). Prereq: ME 222. Biomechanical Concentration Course.
ME 497 Biomechanical Design in Product Development. 3(3-0). Prereq: ME 371 or concurrently. Biomechanical Concentration Course.
CHE 483 Brewing and Distilled Beverage Technology. See Override Instruction #7 Below. Location: 2000 Merritt Road, East Lansing. Prereq: (Age 21 or higher) and (Senior standing) and (ME 410-Heat Transfer or concurrently).
BE 445 Biosensors for Medical Diagnostics. 3(3-0). (BS 161) and (CEM 141) and (ECE 345). Biomechanical Concentration Course.
ENE 422 Applied Hydraulics. 3(2-2). Prereqs: ME 332.
MSE 425 Biomaterials & Biocompatibility. 3(3-0) Prereq: MSE 250. Recommended Background: PSL 250. Biomechanical Concentration Course.
ME 802 Advanced Classical Thermodynamics. 3(3-0). See Override Instruction #6 below. Prereq: ME 412 plus GPA of 3.5+.

**OVERVIEW INSTRUCTIONS**

1) Complete and submit the ME Override Request Form: [Click on Forms & Handouts]
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. To be "on record," you must meet with Gaile to plan a long-term schedule. To request an override, email Gaile [griffore@egr.msu.edu] and be sure to include your PID number with your request. NOTE: A prerequisite override will be given to students who will need to take ECE 415 & ME 451 concurrently.
4) Complete and submit the ECE Override Request Form: [Click on Forms & Handouts]
5) ME majors do not need to have taken the Recommended Background courses, but you will probably need to do 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.
7) CHE 483—To request an override, submit the CHE Override Request form: [Click on Forms & Handouts]
## Spring Semester Calendar

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 14</td>
<td>Scheduled appointments begin for enrollment for Summer 2015. Your enrollment access date is posted in StuInfo.</td>
</tr>
<tr>
<td>May 20</td>
<td>Junk Yard Wars. Sponsored by ASME.</td>
</tr>
<tr>
<td>May 25</td>
<td>Senior Send-Off, 5-7 p.m. in 1345 EB. Sponsored by the Center.</td>
</tr>
<tr>
<td>March 30</td>
<td>Senior Elective Night, 7:00 p.m. in 1234 EB. Sponsored by Pi Tau Sigma.</td>
</tr>
<tr>
<td>April 3</td>
<td>Computer enrollment begins for Fall 2015 / Spring 2016.</td>
</tr>
<tr>
<td>May 1</td>
<td>Design Day in the EB. See you there!</td>
</tr>
<tr>
<td>May 4-8</td>
<td>Final Exams.</td>
</tr>
<tr>
<td>May 8</td>
<td>University Undergraduate Student Convocation–1:00 p.m. in Breslin.</td>
</tr>
<tr>
<td>May 10</td>
<td>College of Engineering Undergraduate Commencement Ceremony, 12:30 p.m. in Breslin. Lasts about 2 hours.</td>
</tr>
<tr>
<td>May 18-July 2</td>
<td>First Summer Session.</td>
</tr>
<tr>
<td>July 6-Aug 20</td>
<td>Second Summer Session.</td>
</tr>
<tr>
<td>May 18-Aug 20</td>
<td>Full Summer Session.</td>
</tr>
<tr>
<td>August 7</td>
<td>Initial Fall 2014 Minimum Tuition &amp; Fee payment due.</td>
</tr>
<tr>
<td>September 2</td>
<td>Fall Semester classes begin.</td>
</tr>
</tbody>
</table>

MSU is an affirmative action, equal opportunity employer. MSU is committed to achieving excellence through cultural diversity. The university actively encourages applications and/or nominations of women, persons of color, veterans and persons with disabilities.