

# Industrial Blueprint

-The IOE Student Newsletter-

Volume 23, Issue No. 3

Brought to you by APM and IIE

December 2009

## Undergraduate Walk-In Counseling Hours

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## Upcoming Dates

Winter Break	December 24
Winter Classes Begin	January 6

## A Few Words From the Editor . . .

Hello IOE,

How is the cold weather treating you? Are you staying healthy so far? You should be since the last Blueprint issue had two articles giving you tips about how to avoid getting sick this winter (and of course to avoid that swine flu). Remember to keep washing those hands.

Well, now it's time for your final Blueprint. We've had a good run. You said some things, I said some thin—oh wait nevermind, we still have next semester! (Phew...)

Enough looking ahead, let's finish this semester the right way...in style. Finals are right around the corner and there's no better pick-me-up than student-written engineering articles, which can be found aplenty starting on page 3.

We have for you some more interesting course reviews, internship experiences, and advice about what to do with your now-football-free Saturdays. I have that saved to memory.

On that note, I'll leave you to your reading, studying, and cramming. Good luck with your finals and stay safe over break. It's been real.

Until next time, stay classy IOE.

Trevor Young

**Visit the IOE Undergrad Page:**

<http://ioe.engin.umich.edu/degrees/ugrad/index.php>

# IOE Student Societies

## Alpha Pi Mu (APM)

<http://www.engin.umich.edu/societies/apm/>

The only nationally accepted industrial engineering honor society, APM membership is based on GPA. All students with junior or senior standing are considered. APM sponsors numerous events every year; highlights from last year include the IOE Bar Crawl and IOE t-shirt sales.

## Engineering Global Leadership (EGL) Honor Society

<http://www.engin.umich.edu/egl/>

EGL is a five-year program that combines engineering curriculum with courses in the Business school and LS&A, culminating in a Bachelor of Science degree and Masters degree in Engineering. EGL is designed to help students improve the bridge between business and engineering in industry, as well as give its members a cultural background to work in an increasingly global market. EGL is no longer an IOE/ME only honor society, but its membership features plenty of IOEs.

## Human Factors and Ergonomics Society (HFES)

<http://www.engin.umich.edu/societies/hfes/>

Nationally, HFES is a professional society whose mission is to “promote the discovery and exchange of knowledge concerning the characteristics of human beings that are applicable to the design of systems and devices of all kinds.” The student chapter at Michigan leads multiple Center for Ergonomics lab tours and attends conferences throughout the year.

## Institute of Industrial Engineers (IIE)

<http://www.engin.umich.edu/societies/iie/>

Another society with links to a national professional society, IIE’s main goal is to “provide an awareness of the Industrial and Operations Department and its resources” at Michigan. The student chapter acts as a conduit to the local Detroit IIE chapter and a networking hub for all IOEs at U of M. IIE sponsors plant tours and features corporate speakers at meetings.

## Institute for Operations Research & the Management Sciences

<http://www.engin.umich.edu/societies/informs>

## Outstanding Multicultural Industrial Engineers (OMIE)

<http://www.engin.umich.edu/societies/omie/>

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## SPANISH 101 Review

By Nirmitt Agarwala

I am currently a Junior and am majoring in Industrial and Operations Engineering. I applied to the Engineering Global Leadership Honor Society this semester, and it is mandatory to complete two years of foreign language as a part of the program. So, I took Spanish because it sounds cool and is in a way the second language in U.S.A. So, I thought it would be useful.

Initially, I was a bit apprehensive about taking Spanish because, before this semester, I had no experience with Spanish at all. In addition to that I thought that it would always be difficult to learn a language when I am twenty years old because it gets more difficult to learn languages as you grow older. But I was mistaken. Spanish 101 is definitely one of the most fun classes I have taken in the University Of Michigan. After three months of Spanish, I can read, write and comprehend most of basic Spanish. However, having a conversation is still challenging.

I think I am enjoying this class so much because of my professor Michelle Orrechio. Her way of teaching the language is amazing. She makes it come across to you as if the entire language is so easy. But, even though it is fun, it definitely requires regular effort. There are daily assignments, twelve journals, an oral exam, a skit, and five exams. So, Spanish does manage to keep you busy. But, it is never monotonous. I would highly recommend taking Spanish 101 as a foreign language.

## Engineering Abroad

By Lucas Radov

While the College of Engineering at the University of Michigan is one of the in the entire world, it stills encourages students to pursue their education abroad. The International Programs in Engineering (IPE) offers over 50 study abroad programs in countries all over the world, from Europe to Asia to Australia. This includes opportunities to study abroad, work abroad, volunteer abroad, or research abroad.

There are many advantages to going abroad. Academically, it allows you to pursue your technical education in a new context and new surroundings. It also allows you to take some courses outside of your major, if that's what you want to do. For professional development, it looks great on a resume if you have gone abroad, showing your independence, willingness to take risks, and ability to excel in a multi-cultural experience. And on top of that, it allows you to experience a new part of the world outside of Michigan and is a great opportunity to travel.

If you can't find something for you, then there are plenty of other programs that any of the advisors in the IPE office could help you look into. When talking with Matt Lokar, a junior in Chemical Engineering who works as a peer advisor in the IPE office, he said that the most important message that he wants people to know about studying abroad is that the IPE office can help. While many people have reservations about going abroad (worrying about graduating on time, the cost of the program, or interferences with internships) Lokar said that he's 99% sure they can find something that will work for you.

If you want more information about going abroad, you can check out the IPE's website at <http://goabroad.engin.umich.edu/> to find contact information and advising hours, or stop by their office in Room 245 in the Chrysler Center.

## **IOE 447 Review**

By Yuying Hu

IOE 447, Facility Planning, is one of the technical electives in our department. This course is in the column of 44x: 441 inventory control, 440 Operations Analysis and Management and 449 material handling, which was expected to exist every other semester but we have not seen it for two years, unfortunately.

447 mainly focus on three aspects: fundamentals in developing efficient layouts for single-story and multi-story production and service facilities; manual procedures and microcomputer-based layout algorithms; and algorithms to determine the optimum location of facilities.

This semester, I am taking this course with Professor Yavuz A. Bozer, co-director of the Tauber Institute. We have 2 exams, 5 graded homework assignments, and a term project on the department layout of a manufacturing plant. Most recently, we have been dealing with location problems.

This is an interesting and enjoyable course: good content, an excellent Professor, and an enjoyable class environment. Professor Bozer traveled a lot, and when he returned, he told us about the place he traveled to. Sometimes it is even more interesting than the content of the lecture! I think the only reason that you may not like this course is because you cannot skip any lectures since he covers material that is not listed on the slides.

## **Suffering Sports**

By Eric Kuykendall

Is it too soon to start worrying about the state of sports at the University of Michigan? I am a junior now and an avid basketball and football fan and, frankly, things just aren't going as well as I hoped they would when I entered as a freshman. It goes without saying that our football team has underachieved for the past few years, and now it looks as if Rich-Rod might have only one more year to prove himself with a decent bowl. Who knows where we go from there in terms of a coach and an overall team? Honestly, a large part of the reason that I chose this university over the competition was because of the legacy of its sports, and lately that legacy seems too far in the past to remember.

Even worse for a huge basketball fan like me, the basketball team seems to have been slightly overrated coming into this fledgling season. One could be confused having seen a quality win over potential NCAA tournament team Creighton and a near second double-double for Manny Harris, but we now have suffered two losses in a row. The first loss was to a team picked to finish in the bottom half of the Big East and a team who many had said was in a very important rebuilding year after the loss of possibly their three best players. The second loss was to unimpressive Alabama. With games coming up during this season versus number 1 Kansas and highly ranked Michigan State and Ohio State teams, our team better pick up the pace and get some pep in their step.

## **Summer Internship; GE Healthcare**

By Annette Stephanou

GE Healthcare has a very good internship program. It is widely recognized because of the value of the projects and tasks interns are responsible for and because of its competitive salary.

I worked for GE Healthcare last summer and thought it was an incredible experience. I was located in a

small plant in Florence, South Carolina, where MRI Magnets are produced. I was responsible for several tasks, but my main goal was to validate the gradient installation process for a new magnet that they were about to launch.

It was my job to create the Work Station Instruction (the instructions for the operators to follow when building the magnet) and to work on all of the documentations documents which included performance, operations and instruction qualifications. Therefore I had to become an expert on the process so that I could tell the operators how to build it.

Another aspect of my job dealt with ergonomics. I performed Ergonomic Risk Assessments for more than sixty different processes around the plant and worked revising documents such as the Management of Change (which analyses how risky the processes are), and Personal Protective Equipment.

Overall it was a great learning experience, especially because I was provided with a mentor. The “mentor” that the business assigned to me, which was my direct boss, was a true teacher. He seemed to really care about how much I was learning, and how useful this internship was going to be for me in the future. It was a pleasure to work for them and I sincerely recommend an internship with GE Healthcare.

## **MKT 300 Review**

By Tony Tricozzi

Intimidated by the lengthy list of approved “Non-IOE Technical Electives” in the IOE Undergraduate Student Guide? Don’t be! If you are an IOE student with a strong interest in business or marketing, look no further than Marketing 300 as your ideal 3-credit course to put towards your graduation requirements.

The course teaches a graphical “Big Picture” approach to marketing strategy that helps students understand and analyze the marketing tactics and decisions of many different corporations and businesses; oftentimes it helps you understand advertising campaigns that you experience on a daily basis. The analysis skills you learn here would be very helpful for a career in consulting or on the commercial side of a business.

Not convinced yet? Would it help to know that you watch YouTube clips all the time in lecture? The class has reading assignments for about every lecture, but they are not lengthy and usually very enjoyable. Small homework assignments are scattered randomly throughout the course, but are not very time-consuming. The course has one midterm and one final; you will probably put most of your time into a “Minicase” group analysis of a product’s marketing strategy, where you suggested an improved approach for that particular business. The group work, nonetheless, is somewhat time-consuming but definitely rewarding when you get to present your case in front of the class at the semester’s end.

Want to sign up? Winter term 2010 has three section offerings for the course, all reserved for juniors and above who are non BBA students (perfect for IOEs). Act fast!

## **Summer 2009 Intern Experience**

By Alvin Steven

I spent three months of my last summer break as an intern in Indonesia Toyo Quality One Co. I worked as an assistant production supervisor in their car’s headliner and cushion department. I was very nervous in the beginning since I had never worked in a Japanese environment. I had to study a little bit of the

Japanese language to make communication easier with my manager. However, I was thankful that my colleagues and manager warmly welcomed and helped me to survive in this company.

A team of five people and I were assigned to apply lean manufacturing in the production line. We were ordered to eliminate waste in their plant by avoiding overproduction and reducing the incidental work time. In order to do this, we drew the current state map so that possibilities of waste would clearly be seen. We then applied continuous flow, pull systems, and combined some dedicated processes to reduce the inventory on the production floor. Buffer supermarkets were then created to fulfill the needs of the pull system processes.

Through this experience, I gained a lot of manufacturing skills and believed that my experience would indeed be useful in my future career path. As soon as I achieve my bachelor degree for Industrial and Operation Engineering at the University of Michigan, I will be back to Indonesia Toyo Quality One Co. as a full-time production supervisor.

## Cultural Olympics Experience

By Ben Boerema

The 2016 Summer Olympic Games will not be held in Chicago, but on September 27<sup>th</sup>, several IOE and EGL students participated in their own Olympics at Burns Park in Ann Arbor. Members learned about games that originated from different parts of the world, but also got in a good workout on a beautiful fall afternoon. Although most attendees had never played any of the games in their lives, it was easy to see why these games were popular in different cultures.

### Game 1: Cada o Cruz (Spain)

Meaning “Heads or Cross”, a coin is flipped and, depending on the outcome, one team chases the other attempting to tag any opposing team member before they reach a safety point about 15 yards away.

### Game 2: Sepak Takraw (Southeast Asia)

Easily described as kick volleyball, Sepak Takraw is a sport resembling volleyball except that it uses a rattan ball and only allows players to use their feet, knees, chest, and head to get the ball over the net to the other team.

### Game 3: Chopstick Game (China)

The goal of the Chopsticks Game is to use chopsticks to transport all of the small objects in one bowl to another bowl about 8 feet away before the other team completes the same task. The toughest object in our bowls to transport was a quarter.

### Game 4: Pies Quietos (Spain)

Probably the most confusing game played, Pies Quietos involves a player throwing a kickball style ball high in the air while calling another player's name. If the ball hits the ground before the called player catches it, all other players are allowed to run until the ball is collected by the called player. Once collected he/she attempts to peg one of the scattering players.

### Game 5: Through the City Gates (China)

A game played by all children growing up in America, but under a different name: Red Rover. Cultural Olympic attendees quickly realized this game becomes much more dangerous the older and bigger the players are.

## EECS 280 Review

By Ben Seavoy

Every student in the College of Engineering must learn the basics of programming in ENGR 101. Some love it, and some hate it. Those in the latter category should not take EECS 280, but if you're in the former, this course could be interesting to you.

Grading for EECS 280 is set up in a similar fashion as ENGR 101. You're graded on a midterm exam, a final exam, and five projects, which are all programming assignments. The only programming language used in the course is C++, but the idea is that the concepts taught can be applied to just about any language. Lectures are twice a week, along with an hour-long discussion section led by one of the many GSIs. The lectures are usually recorded and posted online, so if you miss a class, it's easy enough to catch up.

This class can eat up a lot of your time. Some of the projects, particularly the third one, can take 20+ hours to complete. While it's extremely rewarding to finish, there is a lot of frustration when things aren't working out. Fortunately, the class utilizes a chat room and forums on its CTools site, allowing students to post their questions for GSIs to answer at any time. Fortunately, the exams are not particularly hard, and the practice exams posted are often very similar to the ones given.

While the idea of taking another programming class after ENGR 101 may sound like torture to some students, I would definitely recommend taking EECS 280 to those that enjoyed programming. If you get Jeff Ringenberg as a professor, the lectures can be very humorous, making this a fun, challenging class for those that are interested.

## IOE 460 Course Review

By Chenchen Lu

IOE 460 is a two-credit course about decision analysis. It is really appealing to me since I am not a good decision maker. It usually takes a long time for me to make a decision. Also, I am not a rational thinker. When I make a decision in daily life, I always use my intuition instead of clearly analyzing the advantages and disadvantages of the decision. Before taking this course, I hoped that I could learn to make decisions in a logical and rational way.

The course mainly focused on using decision trees, influence diagrams, the value of information, attitudes towards risk, and the expected utility to analyze difference factors while making a decision. There were quizzes every week and they were not difficult. It was a good way to help me review the previous lectures. We had a project where we had to build a model that describes the drivers of health care costs. It trained me how to use Analytica, a modeling software, to draw influence diagrams. It also trained me to use a diagram to make a sensitivity analysis of the drivers. Also, the project provided me a good chance to become familiar with the American health system, which is very different from the Chinese health system.

Professor Bordley is very knowledgeable about this field and he is very humorous. As the course is a half-term course, each lecture lasted 2 hours. It is a bit long. However, I felt I could easily concentrate on the lecture throughout the two hours and I really enjoyed it. Professor Bordley illustrated the theories with clear and simple words in his daily examples. He even "flipped a button" in the lecture to explain DeFinetti's revised rule of succession. He always interacted with the students well and we all loved to com-

municate with him during the breaks or after lectures. He worked for GM for many years and is also a big fan of GM. He told us stories about GM and used it in his examples. I really think he is very professional and very dedicated.

After the course, I believe I am on my way to becoming a rational decision maker. The knowledge itself is very dreary, but when we connected it into our daily life, we found it to be a lot of fun. Now when I am faced with a choice, I will list the pros and cons, and then compare them one by one. I wish this course lasted longer and went deeper into relevant topics. Overall, I strongly recommend that you take this course if you are somewhat interested in decision making.

## **MSU Online Physics Course Satisfies UM Physics 240 Requirement**

By Christina Nicolia

Physics classes at the University of Michigan are, to say the least, difficult. I was one such student who took Physics 140 at UM, dedicated endless amounts of time to studying for exams, and still suffered a hard hit to my GPA because of the class. At the end of the semester, not only did I feel discouraged and frustrated, but also I did not feel confident in the material I had learned in the class or prepared for future physics classes. I am sure that I was not alone with these feelings, especially amongst the Industrial and Operations Engineering students, many of whom find alternative ways to satisfy their general physics requirements outside of UM. After my experience with Physics 140, I was determined to take Physics 240 outside of the University of Michigan.

The summer before my junior year, I satisfied my Physics 240 requirement through an online physics course titled "Physics 184B", offered by Michigan State. Putting all judgments about MSU aside, I strongly suggest you consider taking this class if your experience with UM physics was anything like mine.

The course is offered in the spring/summer semester. It lasts the entire summer, from mid-May to mid-August. There is a textbook and workbook (optional). Both books can be ordered from MSU bookstores over the phone. I am sure the book is offered on other websites as well, such as Amazon or Chegg. There is one homework assignment due each week, and there are a total of 4 tests (3 exams and 1 final). One chapter is covered each week. There are no lectures or notes posted online. All of the learning is done independently using the textbook. For students who are located more than a 1-hour drive from the MSU campus, all exams are online, like the homework assignments. LON-CAPA is the program used for homework and exams.

### **Q & A**

**Q1:** Is it hard to complete the homework assignments with no available office hours or lectures?

**A1:** No. The homework/exam database is designed such that, for each homework problem, there is a chat room available to all students and the instructor. Students can post questions, solutions, and helpful hints for their fellow classmates. This is the most effective way to get a question answered. There is the option of sending personal messages to other students, as opposed to chat room comments. The homework assignments are very reflective of the material in the corresponding chapter. If there is a homework problem that many students are struggling with, and the chat room for that problem is full of comments expressing students' confusion, the professor will post a comment explaining the problem and how to complete it.

**Q2:** How much time does the class require? Is it hard to learn the material on your own?

**A2:** The class requires a lot of self-discipline. It does take time to read the chapter. I suggest that you take some notes and do the in-text example problems. However, take comfort in knowing that the homework does not deviate from what is taught in the text book and that the exams are very reflective of the homework assignments. The homework assignment difficulty varied depending on the chapter and length of the assignments. Usually, I'd study and work on the homework sets for about 2 hours every day. This was enough time to learn the material and complete the homework assignments on time.

**Q3:** How do I apply for the class?

**A3:** To take the class, you apply to MSU as a "lifelong student". For more information contact the Office of the Registrar at (517)355-3300.

**Q4:** How prepared did you feel for taking Physics 241 at UM (the laboratory corresponding to Physics 240)?

**A4:** I am currently enrolled in Physics 241 at UM and feel well prepared for all experiments. The MSU course was great preparation for the laboratory class. The only difficulty is remembering the material learned over the summer. Keep your textbook/notes from the MSU course so you can reference them if necessary for preparation for individual labs.

## Free Saturday!

By Jillian VandePutte

Now that this season of Michigan football has come to a close, we need to find new excuses to neglect homework on Saturday afternoons. The following is a list of suggestions to help fill the void:

- 1) M-Flicks: M-Flicks is a film group that shows movies on BIG screens around campus. The showings range anywhere from special sneak previews to older classics. Best of all, it's FREE! Who wouldn't want to be able to say they saw 'The Hangover' before everyone else? To find out more about the upcoming screenings, visit their website at <http://www.umuac.org/m-flicks/index.html>.
- 2) Basement Arts: Feel like you need more time on North Campus? Basement Arts is a student-run theater organization that puts on a variety of productions in the Walgreen Drama Center. Basement Arts' mission is to provide quality, student-produced theater every weekend of the school year. The productions are student-directed, acted, and designed and are open to the whole University of Michigan community. Did I mention, it's FREE? For more information, check out their website at <http://basement.studentorgs.umich.edu/>.
- 3) Comco: Looking for laughs? Comco is the University of Michigan's oldest and best comedy group on campus. Originally begun as a sketch comedy group, ComCo has moved on to stand-up, experimental writing, and is now an improvisational group. For information on upcoming shows, visit <http://www.umuac.org/comedy/index2.html>.
- 4) Mini-courses: Mini-courses are non-credit classes offered to all University of Michigan students, faculty, and members of the Ann Arbor community. From bartending to massage therapy to yoga, a mini-course is a great way to meet new people and pick up useful skills. For listings of current offerings, visit <http://uuis.umich.edu/minicourses/>.

## **Taking a Language: Good or Bad?**

By Christine An So

As far as engineering graduation requirements go, taking a language is not mandatory. However, I have found that there are quite a few up-sides to this humanities option.

For one, language classes are a nice break from our rigorous engineering classes. From my experiences of taking Japanese, I have found the class much more interactive and engaging than any of the IOE courses I have taken thus far. Throughout each lecture and recitation section, you are required to practice speaking the language by either conversing with your classmates or speaking aloud in front of the entire class. This can be somewhat intimidating at first for those of us who do not like to actively participate in class, but the more you have to do it, the easier it becomes.

There are some classes in which it is possible for you to slack off the entire semester and then cram for the exam. However, this strategy will not work too well for a language course. The active participation in class also forces you to keep up with the progress of the class. I know you have probably heard all of your professors say this, but this time it is actually true. You really cannot cram for a class like this in one night. You really do have to study a little bit everyday for a language class to do well in it. I know it sounds like a lot of work, but the plus side to this is that it makes studying for exams really easy since you have been keeping up with everything.

This leads me to my second benefit of taking a language: the workload is light compared to the assignments we get from our engineering courses. Sure, there is homework every day, but it is not meant to be hard. The homework is just designed to make you familiar with the grammar structures you learned that day, so it normally goes by pretty fast.

In conclusion, if you are looking to fill up some humanities requirements, I would suggest taking a language. It is fun, interactive, and, overall, a lighter workload compared to some of the kinds of courses we are used to.

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## **Industrial Engineering for Small Businesses**

By Eric Porter

The time is fast approaching when everybody is looking for a summer internship. Many students will look for work in major consulting firms, manufacturing companies, or other giants of the corporate world. These positions have their merits, and there is certainly much to learn when working for a large organization. But I would personally recommend at least spending one summer working for a small business. Not only do you feel more connected with the success or failure of the company, but you can have a great time while working.

For the last three summers, I worked for a small novelty supplier in my hometown. When working for a small business, you should expect to be asked to do just about anything. There were days were I would start out by taking out the trash. Then I would show some customers around, and at the end I might be making a delivery out of state. You will be involved in almost every aspect of the business.

Industrial engineering principles can be applied to your work as well. Often times, small businesses are in niche markets, or have very few competitors. Thus, it is easy to see how price wars are started, and how other economic principles affect the bottom line. You will also be working closely with the owner of the

business, who is always looking for ways to be more efficient and squeeze every profit dollar out of his or her business. In a small business, it is easy to see how your advice and knowledge get translated into higher profits.

So before you are waiting in line at a career fair for a chance to interview for an internship, think about working for a small business. They provide an excellent opportunity to apply the problem-solving and decision-making strategies of industrial engineering.

## **Getting Your Minor in Math**

By Joe VanValkenburg

As an undergraduate student in the Industrial and Operations Engineering program at the University of Michigan, there are several requirements that you must complete in order to receive your degree. These requirements may seem very demanding and it may seem very tough to add additional degrees to your transcript and remain on course to graduate in your desired time-frame. However, subjects like mathematics are very possible to pick up a quick minor without investing too much additional time and course work.

A math minor will require between 15 and 18 credit hours to complete. This includes the student's choice of either two second-year courses and three upper-level courses or one second-year course and four upper-level courses from the math department. As an IOE student, Math 215 (calc III) and Math 214 (Linear Algebra) are already required classes for your bachelor's degree and also count as the two second-year courses towards the math minor. This leaves you with three upper-level math classes that separate you from your Math minor.

Another requirement in the undergraduate IOE program is that you must have 18 credit hours of technical electives (of which at least 12 must be IOE classes). This leaves up to six (6) credits that you can take outside of the IOE department to count as technical electives. There just so happens to be several different choices of three-credit upper-level math courses that fit the technical elective requirement for IOE students.

To wrap up, using your mandatory math classes and taking math courses as your free technical electives leaves you only one additional class away from a math minor. If you decide to pursue a minor in mathematics, please talk with advisors from both the Math and IOE departments to make sure that you take courses that will satisfy the requirements for both degrees.

## The Backpage Wordsearch

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t	i	c	a	n	g	e	l	l	h	a	l	l	t	e	e	y
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y	b	y	c	j	d	i	e	b	s	r	k	r	s	a	r	b

Diag	North Campus	Ugli
Lurie	Fishbowl	Baits
Randall Lab	Angell Hall	CC Little
Michigan Union	Markley	Yost Ice Arena
Dana Building	Main Street	Elbel Field
Kresge	Dennison	CCRB
Bursley	Michigan League	Mosher Jordan
Oxford Housing	Duderstadt	