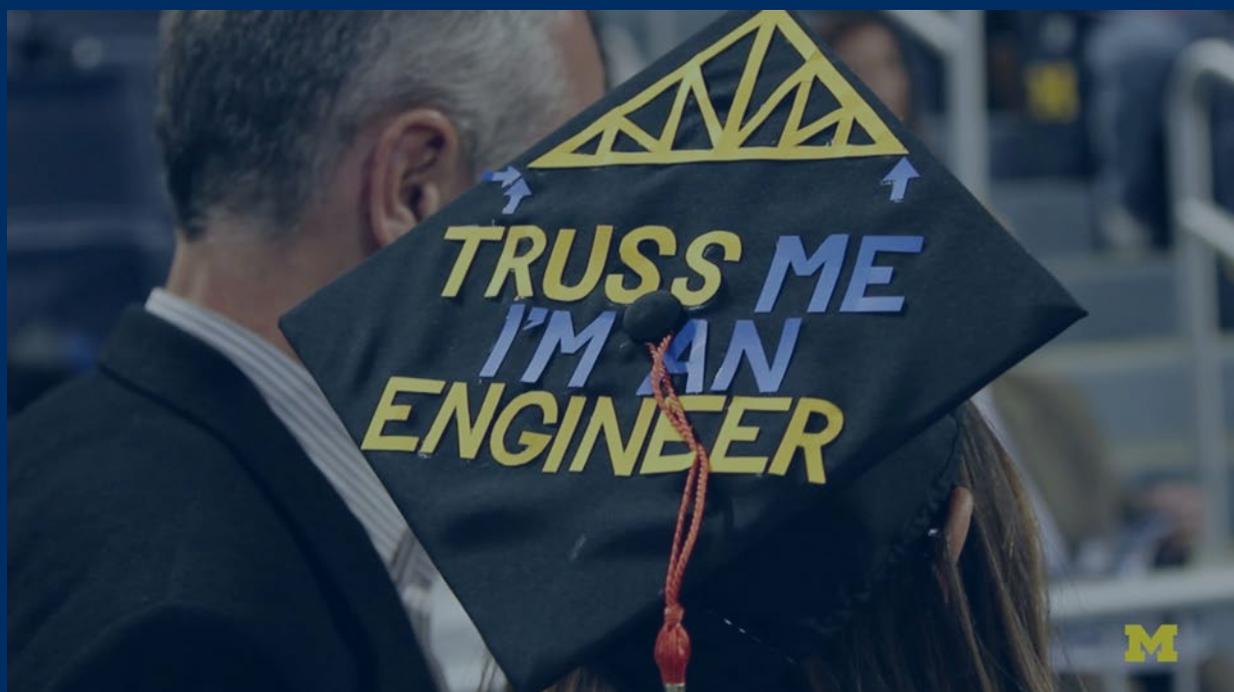


Industrial Blueprint

- The IOE Student Newsletter -

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IOE Course Guide

From the Editor

Hi IOE,

Hope your semester is going well! As you begin winding down your semester and start thinking about classes you want to take in the Fall Semester, here is a Blueprint edition of the Michigan IOE Course Guide. We hope this guide will help you in your course decision-making and possibly save you multiple trips to Wanda or your Peer Advisors (guilty as charged). This Course Guide compiles class reviews of Core Courses, Non-IOE Engineering Courses, Technical Electives, Intellectual Breadth Classes and General Electives - all written by other students. Hope you enjoy it, happy reading!

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Non-IOE Engineering Courses

CEE 211 – Statics and Dynamics

By Michael Brown

CEE 211 is a continuation of Physics 140. It starts off by recapping that course, and then goes into topics including: structural analysis, distributed loads, and vibrations. This is an important class because it allows you to see how structures are constantly under different pressures and forces. Therefore, it is very important to understand the material that this class teaches. I learned a lot about bridges and trusses and got a nice introduction to civil engineering.

CEE 265 - Sustainable Engineering Principles

By Jenna Locricchio

This course focuses on the economic, environmental, and social aspects of sustainability in relation to engineering. Topics covered in this course include product life cycle assessments, carbon, water, and energy footprints, economic assessments, and mass and energy balances. There are three exams, weekly homework assignments, and occasional pre-class videos to watch. Overall this class has prepared me to make educated engineering decisions in the future, knowing how these decisions will impact the economy, environment, and society. CEE 265 is a valuable course for engineering students of all disciplines to take.

MSE 220 – Materials and Manufacturing

By Mark Spencer

This class was an introductory materials class where you learn all about different properties of many different types of materials, all originating from the main 4 of metals, polymers, ceramics, and composites. I took the “no-exam” version of the class and I thought it was much more beneficial in terms of learning the material. You are tested more frequently on quizzes, which forces you to keep up with the material. Also, you gain some valuable teamwork skills, as there are 3 projects in the class. There isn’t too much lecturing, which may make it hard to learn confusing topics, but overall it isn’t too bad.

Non-IOE Engineering Courses

EECS 280 – Programming & Introductory Data Structures

By Colin Pitawanakwat

In this course you will learn many programming concepts, such as recursion, pointers, abstract data types, polymorphism, and dynamic resource management. Notable projects include implementing versions of Euchre and Blackjack. This class is important because you learn programming skills that you can apply to many different situations. After taking this class, I gained a deeper understanding of programming. I feel more confident in my ability to understand code, and my ability to learn different languages and concepts on my own.

MATH 424 - Compound Interest and Life Insurance

By Mark Spencer

This class is all about how to manage money, basically a more advanced version of IOE201. Not only do you learn how to move money between the present and the future, but you also learn tricks to save the most money when working with a bank. I found this class really interesting as it provides you with necessary money-managing skills that you will need later in life, whether that is with taxes, or loans, or bonds, etc. The professor is extremely nice and the class is actually pretty easy given the heavy focus on math. If you enjoyed IOE201, then this class is perfect for you.

IOE Technical Electives

IOE 419 – Service Operations Management

By Colin Pitawanakwat

Service Operations Management focuses on developing models for the service industries, such as transportation, health care, education, and emergency services. The models have a focus on minimizing cost and enhancing customer service. Key topics in the class include facility location planning, resource allocation, workforce planning, inventory management, and queuing. This class is important because of the vast number of application in the industrial and operations engineering field. In fact, the service industry accounts for approximately 75% of US employment. After taking this class, I have gained an understanding of how to develop and utilize models to optimize service industry problems.

IOE 437 - Automotive Human Factors

By Michael Gashaj

This class is taught by Professor Paul Green, who does a great job thoroughly covering the topics related to Automotive Ergonomics. Homework assignments and participation are the only factors that count towards the final grade, and all assignments are related to the presentations given in class. The topics include roadway human factors and vehicle human factors, which include roadway design, dashboard design, design of experiments, and related crash data. The course contains four major assignments, all of which are described in the first week of class, and are clear if you follow the presentations given in class. Professor Green is a master of automotive human factors, and has great insight on the modern standards of roadway and vehicle design, and has also taken part in writing some of the standards that are in place today.

IOE 452 – Corporate Finance

By Aaron Zhou

IOE 452 is Corporate Finance. The goal of this course is to introduce a basic understanding of financial management. The course develops fundamental models of valuation and investment from first principles and applies them to problems of corporate and individual decision-making. The topics of discussion include the net present valuation, optimal portfolio selection, risk and investment analysis, issuing securities, capital structure with debt financing, and real options. The exam is fair once you do the homework and study the slides. At the completion of this course, students will have developed skills in recognizing the inherent role of no-arbitrage in well-functioning capital markets.

IOE Technical Electives

IOE 440 – Operations Analysis and Management

By Nicole Bartecki

Operations Analysis and Management (IOE 440) is a great class to take. You get to learn about capacity management, optimization, linear programming, inventory management, factory dynamics, variability, and supply chain management. This class has sparked my interest in supply chain and taught me a lot about how systems work. I think this class can be applied to many IOE related internships, it even helped me in multiple interviews! I would highly recommend this class.

IOE 447 - Facility Planning

By Taylor Pfershy

In this class we learned about many different aspects of planning a facility, as well as the different applications of techniques to the different types of facilities that you could encounter. This was a very interesting class that kept me engaged the entire time as well as taught me how many different facilities are run. Even though we learned about the planning of a facility, through this process I got a lot of insight into how and why different types of facilities run certain ways which will be helpful for any type of Operations job. This class has weekly homework assignments, two exams (no final) and a final project. Professor Bozer is super helpful in office hours and is very engaging during lectures.

IOE 461 – Quality Engineering Principles

By Allison Zimmerman

IOE 461, Quality Engineering Principles, teaches you how to analyze data using Minitab statistical software to solve engineering problems. Throughout the semester you will learn the Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control) problem solving methodology. Topics include process capability analysis, design of experiments, and statistical process control. Through multiple group assignments and projects, you learn how to break down engineering problems and analyze them through the use of statistical tools. The real world applications make this class extremely useful in any internship or job, regardless of what field you choose to pursue.

IOE Technical Electives

IOE 491 - Special Topics in Industrial Engineering: Constraint Programming (Winter Semester)

By Ilkka Kovanen

What exactly is constraint programming? Constraint programming is a modeling method, similar to linear programming, that can be used to solve optimization problems in IOE. Unlike linear programming, the models in constraint programming are defined by their constraints. Constraint programming allows for more "natural" problem statements than linear programming, and can help us solve problems that are otherwise very difficult, such as the traveling salesman problem or the nurse scheduling problem. IOE 491 primarily consists of a series of projects that look into the various capabilities and intricacies of the OPL modeling language (part of the IBM ILOG CPLEX Optimization Studio), which is used to model and solve constraint programming problems. Professor Van Hentenryck has a deep understanding of both constraint programming and the OPL language, which he helped design. The course is fun, interesting, and gives a good introduction to constraint programming, which will be an important tool for anyone doing operations research.

Approved Non-IOE Technical Electives

ECON 437 - Energy Economics and Policy (Winter Semester)

By Ilkka Kovanen

If you like economics or like courses related to energy, you should take ECON 437. Energy resources and energy markets have several distinguishing characteristics that make them very interesting from an economics standpoint. ECON 437 covers several different energy topics, including energy demand, oil and gas markets, electricity markets, environmental and energy policy, and the role of energy in development. There's also an electricity market simulation game which is a lot of fun! In IOE, energy economics are essential if you're working on any project in the energy industry or that has large energy requirements. I think ECON 437 did a great job of helping me understand the specifics of energy economics, as well as teaching me how to analyze and understand energy markets.

STRATEGY 302 – Business Strategy (Winter Semester)

By Allison Zimmerman

Strategy 302, taught by Dr. Anu Nagarajan, has been one of the cornerstone classes of my education at the University. In Strategy 302, we learn how companies should position themselves to sustain or create a competitive advantage in the context of the business landscape. Through studying industry structures and value chains and analyzing a firm's resources and capabilities, we discuss how firms should best compete in their industry. The course consists of 10 quizzes (instead of exams), a group project, as well as case studies and readings for class. By studying smaller amounts of information more frequently for the quizzes, you are able to learn and apply concepts to new material more effectively. This class will help you understand the strategy of any company you may work for in the future.

ACC 471 – Accounting Principles

By Sarah Park

This has been a great class that I have learned a lot from. One of my favorite parts has been that it is relatable to IOE 201. Topics such as cash flows and depreciations are covered. I have really enjoyed going into more depth with these topics. Accounting has been a great way to also get exposure to business concepts and to take a class at Ross.

Approved Non-IOE Technical Electives

FIN 302 – Making Financial Decisions

By Allison Zimmerman

Finance 302 is a great class for anyone looking to pursue a business-related career or management role at a company. You learn major concepts such as the time value of money, valuation of stocks and bonds, costs of financing, and the relationship between risk and return. You learn how financial decisions are made in companies and what numbers drive them. Additionally, you learn some of the nuances of how the stock market works and have the opportunity to participate in a class-wide stock market game. There are homework problems, 3 midterms (your lowest of which is dropped if you complete all of the homework assignments), and a final. Many office hours and review sessions are offered before each exam, ensuring you have all the help you need to succeed in the class.

ENTR 407 – Entrepreneurship Hour

By Andrew Fountain

This course is designed to introduce students to entrepreneurship through a series of seminars. These seminars include entrepreneurs, business leaders, and venture capitalists. Speakers share their knowledge of the most important issues in entrepreneurship and the related infrastructure. This class is just a one credit pass/fail and does not require much work as a result. Anyone who enjoys listening to knowledgeable people with interesting stories and advice would enjoy this class.

Intellectual Breadth

ECON 101 – Principles of Economics I

By Michael Brown

ECON 101 teaches basic microeconomic concepts including supply and demand, firm and individual behavior, and competition and monopolies. You learn how firms behave depending on what the market state is or what competitors are doing. This is an important class because it is important to have a fundamental understanding of how the economy functions. I learned how taxes impact the price of goods, and how this tax is distributed between the sellers and buyers. Also, I learned about game theory, which is a very interesting concept explaining how the actions of one participant impact another's actions.

ENGLISH 125 – Writing and Academic Inquiry

By Sarah Finley

Each section of English 125 is run by a different professor, so they can vary greatly from section to section. My section, however, was focused on persuasive academic writing, a skill which could come in handy in engineering jobs when writing proposals or memos. We learned about strategies for persuasion, effective research methods, and techniques for structuring a piece of writing. Due to the small class size, the professor was able to give each student individualized feedback on each piece of writing as well as organize multiple peer review sessions for each assignment, both of which were very helpful in improving my writing skills. I liked that this class investigated some of the practical applications of writing in business, and I feel that the skills I learned will be useful in later classes as well as in a career.

PSYCH 111 - Introduction to Psychology - SS Technical Breadth

By Jake Biegger

PSYCH 111 is an introduction to psychology course that introduces the concepts of thought and behavior. In this course, students learn about the the fundamental concepts of psychology as well as studies and cases where these concepts have been tested. This class is important because in every class or workplace, people must interact with each other. Learning about factors that affect thought and behavior of both individuals and groups can help when working with others. I learned how people think and develop, and I was able to learn a lot about my own thought processes as well through this class.

Intellectual Breadth

SPANISH 295 – Introduction to Hispanic Literatures

By Morgan Freeby

For any Spanish Minors out there looking for a Literature credit, this is the one. Any class that counts as a literature credit will be more work than those that don't, but I found that this class had a fairly reasonable workload. A large portion of the grade came from participation as well, so A+ efforts could help boost not-so-A+ exam scores. The class consisted of readings, (some smaller than others), and a small movie component at the end. Each student also had to prepare a presentation with a partner.

CLARCH 350 - Topics in Classical Archaeology - The Rise and Decline of Ancient Cities (Topics vary by semester)

By Jake Biegger

This elective course focuses on the underlying factors that caused ancient cities to rise, thrive, as well as decline. There is a large emphasis on the general traits of ancient cities in regard to these aspects compared to specific examples of cities. Traits such as location, resources, fortifications, and common city layouts are analyzed. This class is important because it allows the understanding of the general principles that make cities flourish compared to decline. I learned that there is a common pattern of success for cities, and this concept of a common framework for success can be seen through other examples such as companies and governments.

CLCIV 385 – Greek Mythology (Winter Semester)

By Julia Clark

CLCIV 385: Greek Mythology is a 300-level humanities. This is a very interesting course that delves into ancient Greek texts. I really enjoyed this class because the topics were interesting and it was unlike any other class I had taken before. This class is a good class to take as a 300-level humanities. I would recommend this class to others because it is unique and can be a good change of pace.

Intellectual Breadth

MUSEUMS 301 – Museums & Society

By Sarah Finley

This class, held in the University of Michigan Museum of Art (UMMA), investigates the role of museums in society, as well as their strategies for engaging and educating the public. As part of the class, students have the opportunity to explore the UMMA, the University of Michigan Museum of Natural History, and the Ann Arbor Hands-On Museum and engage in class discussions about each museum. Over the course of the term, students also construct their own virtual museum exhibit about the topic of their choice. Through this class, students gain an understanding of the inner workings of museums and all of the behind the scenes work that goes into creating an exhibit. The class also provides context about the history of museums and investigates how museums are changing as technology improves. Overall, this class is interesting, unique, and captivating, and it gives students a different take on museums and their role in our world today.

SLAVIC 312 – Central European Cinema

By Nathan Estes

Central European Cinema is a humanities course offered through the Slavic Language and Literatures department. The class is broken down into two components, discussion and film viewing. Each week you will view a different movie that was filmed and produced in Central Europe and discuss the social and political impacts of the film. The films focus on issues such as characteristics of rescuers during the Holocaust, gender equality under the Communist regime, and religious persecution in the former Yugoslavia. I found the class to be a great way to step outside of the engineering curriculum and learn about subject that I might never have taken the time to explore.

HIST 318 - History of Total War In Europe (Winter Semester)

By Praneet Gogireddy

I took this class as my 300-level Intellectual Breadth. This class consisted of weekly blog reports and in-class i-clicker quizzes. There were no exams. History 318 focused on the age of Total War in Europe. I learned a great deal about World War 1 and World War 2, as well as nationalism and communism in Europe. This class was important for me as it was my first history class taken at the University of Michigan, and I found it very interesting. The readings were interesting and the blog posts allowed you to express your historical viewpoints. Overall, I highly recommend History 318.

Intellectual Breadth

GERMAN 325 - German for Engineers

By Jenna Locricchio

German for Engineers was by far the most enjoyable course I've taken at Michigan. If you've completed the first four semesters of German, I highly recommend taking this class to advance both your speaking, writing, and engineering skills. Topics covered include the functioning of various engines, alternative energy sources, and other technologies. We took two field trips to an automotive lab and a local manufacturing plant, which were both informative and interesting. The class had weekly quizzes, a couple presentations on topics of your choice, and no exams.

GERMAN 386 - German Fairy Tales

By Sarah Park

German Fairy Tales is a humanities class that satisfies the upper level humanities requirement. This class was a great combination of being interesting, but also did not overwhelm my work load. The time commitment was minimal, but all work done was meaningful. This class was a great break from the technical classes of engineering. Homework was to read fairy tales once a week. This class really explored the meaning behind the classic fairy tales we are all familiar with and was a very enjoyable class to be a part of. I learned a lot about German culture and how it affected these fairy tales and this experience has expanded my cultural knowledge.

General Electives

ASTRO 102 – Introductory Astronomy: Stars, Galaxies, and the Universe

By Morgan Freeby

This class is essentially what its title says: its an introduction to the universe. If you need a few more general elective credits or are just looking for a class that would be interesting to take for “fun-sies”, this is probably the class you are looking for. It is four credits consisting of a lecture and weekly discussion. I do recommend taking the class pass/fail because it is a lot of work. The discussions were unique because they were sometimes held at the Angell Hall Planetarium or in the Detroit Observatory.

SI 110 - Introduction to Information Studies

By Jake Biegger

SI 110 is a class about the study of information where you will learn about what exactly defines information, how humans use it, and how it has developed over time. This class details the theoretical, cultural, and economical implications of information and how the Information Revolution has redefined many aspects of life. While many EECS classes teach programing and other skills related to computers, this class takes a more holistic approach to understand how computers have impacted society. It is important to understand the effects of computers and information in this day, and SI 110 helps accomplish this. I learned about the sheer amount of information available, as well as how computers are promoting as well as limiting it.

EECS 203 – Discrete Mathematics

By Alexander Copp

This course teaches some of the thinking behind computer science. Logic, set/graph theory, and complexity analysis are all things you will learn about in this class. While you might not immediately see how everything relates to computer science, there is a lot of useful information you will learn in this class. If you struggle a little bit with this class, I would not necessarily count yourself out of a computer science minor. In my experience, your performance in 280 is more important than your performance in 203 in terms of how well you will do in 281. You will definitely see some things from 203 again in 281 though!

General Electives

ENGR 260 – Engineering Across Cultures

By Nathan Estes

Engineering Across Cultures is a 1-credit course that is a requirement for the International Minor for Engineers. The purpose of the class is to recognize that engineering is a global profession and discover the international impact of the profession. In this class, you will learn about different aspects of the design process that need to be considered when working outside of the United States. The course culminates in a group project where you get to learn about a foreign culture and create a product to fulfill a need in that country. From a professional perspective, this course helped develop better intercultural awareness, which is something that many employers value.

EECS 281 – Data Structures and Algorithms

By Alexander Copp

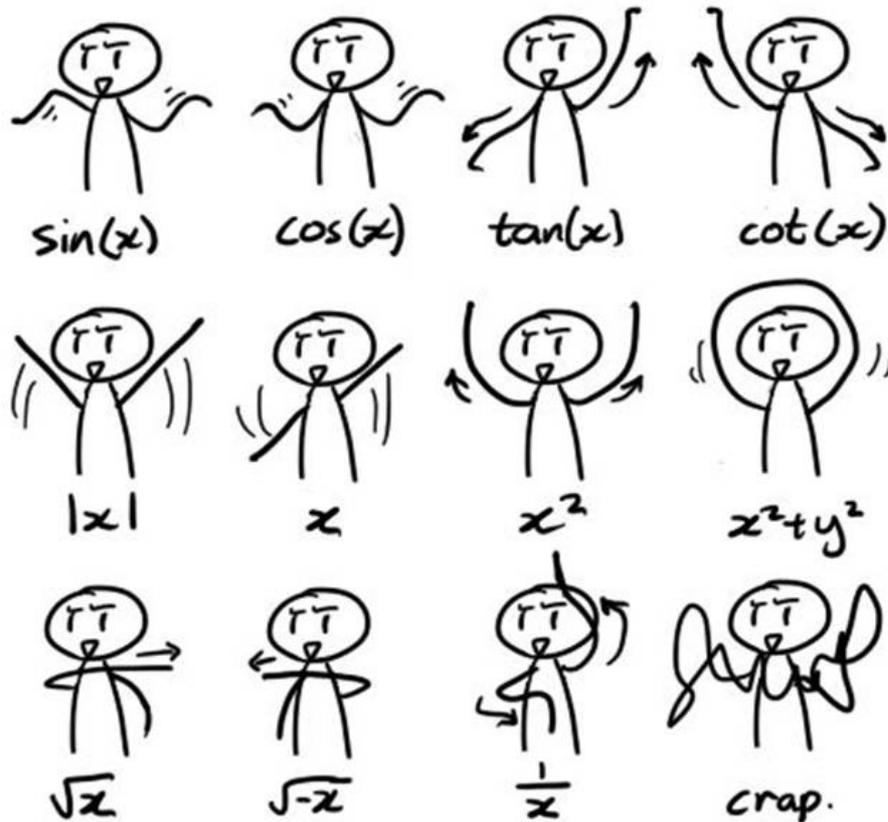
You may have heard this class referred to as one of the hardest classes at Michigan. While that may not be far from the truth, you will also hear that this is many people's favorite class they took at Michigan (after they're done). You will spend long and sometimes frustrating hours on your code, but it will be very rewarding when you succeed. This class is not just about getting the right answer, but also getting it in the most efficient manner possible, both runtime-wise and memory usage-wise. My one piece of advice would be start your projects early! An early start date correlates positively to a good grade when it comes to projects.

MATH 425 – Introduction to Probability

By Mark Spencer

This class was an introductory to probability. You learn some theory behind the basic probability theorems that you may have learned in high school. I thought it was pretty hard and there is a pretty hefty grading curve at the end of the class. This is important because not only does it prepare you well for IOE265, but it also further explains some of the theorems that we take advantage of during IOE265. If you enjoyed the probability part of IOE265, then I would definitely recommend this class.

Dance Class for Engineers



Thanks for reading!