Department of Industrial Engineering
Undergraduate Student Handbook*

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For information or questions:

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* This handbook is meant only as a guide for students. The definitive source for degree requirements is the University of Arkansas' Catalog of Studies, which can be found at: (catalog.uark.edu).
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Dear Industrial Engineering Undergraduate Students,

Welcome to Industrial Engineering and congratulations on selecting a discipline that will prepare you for a rewarding and relevant professional career for a lifetime! The vision of our program is to be a nationally-competitive, student-centered, Industrial Engineering program serving Arkansas and the world through undergraduate and graduate studies, through leading-edge research programs, through contributions to the profession, and through our unique access to major organizations with world-class logistics and distribution operations. To be a model program providing a broad, personalized undergraduate experience, contemporary graduate and professional programs, and research emphasizing the application of quantitative modeling and analysis. To be leaders in the industrial engineering profession. The objective for our undergraduate program is to prepare students for successful industrial engineering careers in the private and public sectors of a global economy; and for advanced studies in high quality graduate programs.

The department faculty and staff are committed to your success while you are a student at the University of Arkansas and beyond. You likely have many questions about opportunities available to you within the department and about meeting all degree requirements to graduate on time. This undergraduate student handbook is here to help answer many, if not all, of your questions. Please review it and refer to it regularly throughout your academic studies to help keep you on track. If there is something that you don’t understand or is not clear in the handbook, then please contact your advisor. Dr. Rossetti, Associate Department Head, and Dr. Cassady, Undergraduate Program Studies Chair, are also available to assist you. Wishing you a successful experience here in Industrial Engineering!

All the best,

Dr. Ed Pohl
Department Head and 21st Century Professor
Department of Industrial Engineering

Dr. Ed Pohl, Professor and Department Head
Students in the Industrial Engineering program can become members of two different organizations, Alpha Pi Mu and the Institute of Industrial Engineers. Both groups have active student chapters within the department. The student chapters are student-led, with new officers elected each fall. Faculty mentors also support the organizations and assist the students with various projects throughout the year.

**Student Organizations**

Ed Pohl, Ph.D.
Department Head and
Global Studies Chair
Contact Dr. Pohl for: Global Studies

Richard Cassady, Ph.D.
Undergraduate Program Studies Chair
Contact Dr. Cassady for: Technical Elective Petitions

Manuel D. Rossetti, Ph.D., PE
Associate Department Head
Contact Dr. Rossetti for: Transfer Credits

Kelly Sullivan, Ph.D.
Honors Chair
Contact Dr. Sullivan for: Honors Program

Letitia Pohl, Ph.D.
Undergraduate Advising

Industrial Engineering Course Descriptions, Plan of Study, Degree Check and information on Global Studies may be found online at the Industrial Engineering website:

http://industrial-engineering.uark.edu

**LOCKERS**
The Alpha Pi Mu student organization rents lockers for a small fee each semester. Contact Dr. Sullivan for more information.

**Alpha Pi Mu Faculty Mentor**
Dr. Kelly Sullivan

**IISE Faculty Mentor**
Dr. Sarah Nurre

**INFORMS Faculty Mentor**
Dr. Shengfan Zhang
Dr. C. Richard Cassady, Professor
Office: Engineering Hall 328
Phone: 479-575-6735
cassady@uark.edu
Courses: Introduction to Industrial Engineering; IE Capstone; Stochastic Operations Research

Dr. Art Chaovalitwongse, Professor
Office: Bell 4170
Phone: 479-575-5857
artchao@uark.edu

Dr. Justin R. Chimka, Associate Professor
Office: Bell 4165
Phone: 479-575-7392
jchimka@uark.edu
Courses: Applied Probability & Statistics for Engineers II; Production Planning & Control; Regression

Dr. Joseph Geunes, Professor
Office: Bell 4167
Phone: 479-575-6042
jgeunes@uark.edu
Courses: Intro to Optimization Theory; Production Planning & Control

Dr. Haitao Liao, Professor
Office: Bell 4171
Phone: 479-575-6196
liao@uark.edu
Courses: Applied Probability and Statistics for Engineers I

Dr. Xiao Liu, Assistant Professor
Office: Bell4174
Phone: 479-575-6033
xl027@uark.edu
Courses: Applied Probability and Statistics for Engineers I

Dr. Ashlea R. Milburn, Assistant Professor
Office: Bell 4168
Phone: 479-575-3702
ashlea@uark.edu
Courses: Appl. Prob. and Stat. for Engineers I; Healthcare Systems Engineering; Transportation Logistics

Dr. Heather Nachtmann, Professor and Associate Dean of Research
Office: Bell 4136
Phone: 479-575-5857
hln@uark.edu
Courses: Decision Models; Industrial Cost Analysis

Dr. Sarah Nurre, Assistant Professor
Office: Bell 4173
Phone: 479-575-3940
snurre@uark.edu
Courses: Intro. to Optimization Theory

Dr. Gregory S. Parnell, Research Professor and Director of Master of Science in Operations Management Program
Office: White Eng. Hall 313C
Phone: 479-575-7423
gparnell@uark.edu
Courses: Project Management; Systems Engineering Management

Dr. Harry A. Pierson, Assistant Professor
Office: Bell 4172
Phone: 479-575-6034
hapierso@uark.edu
Courses: Robotics, Manufacturing Processes

Dr. Edward A. Pohl, Professor and Department Head
Office: Bell 4210
Phone: 479-575-6029
epohl@uark.edu
Courses: Heuristic Optimization; Appl. Prob. And Stat. for Engineers II; Reliability Engineering

Dr. Tish Pohl, Clinical Assistant Professor
Office: Bell 4208
Phone: 479-575-3667
tpohl@uark.edu
Academic Advising
Courses: Engineering Economic Analysis; Ergonomics: Facility Logistics

Dr. Chase E. Rainwater, Associate Professor
Office: Bell 4166
Phone: 479-575-2687
cer@uark.edu
Courses: Operations Research Modeling; Appl. Prob. and Stat. for Engineers I; Decision Support Systems

Dr. Manuel D. Rossetti, Professor
Office: Bell 4164
Phone: 479-575-6756
rossetti@uark.edu
Courses: Simulation; Intro to Database Concepts for IEs; Systems Simulation

Dr. Kelly Sullivan, Assistant Professor
Office: Bell 4177
Phone: 479-575-2563
ksullivan@uark.edu
Courses: Network Optimization, Applied Probability and Statistics for Engineers I

Dr. John White, Chancellor Emeritus and Distinguished Professor
Office: White Engineering Hall 308
Phone: 479-575-2772
jawhite@uark.edu
Courses: Engineering Economic Analysis; Facility Logistics; Advanced Engineering Econ

Dr. Shengfan Zhang, Assistant Professor
Office: Bell 4174
Phone: 479-575-3571
shengfan@uark.edu
Courses: Quality Engineering and Management; Engr. Appl. of Prob. Theory & Stoch. Processes; Decision Modeling in Healthcare; Applied Probability and Statistics for Engineers II
Industrial Engineering Department

Karen Standley
Assistant to the Department Head
Office: Bell 4210
Phone: 479-575-6029
standle@uark.edu
Contact Mrs. Standley for: Tuition Questions, Scholarship Questions

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Fiscal Support Analyst
Office: Bell 4211
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sehon@uark.edu
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Office: Bell 4134B
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Contact Mr. Sparks for: Computer support; software questions

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Computer Support Technician
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ablevins@uark.edu

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tellenbe@uark.edu
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Administrative Analyst
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Phone: 479-575-3156
cboyd@uark.edu
Contact Mrs. Pennington for: Degree Check information

Garn LeBaron
Systems Administrator
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glebaron@uark.edu
Contact Mr. LeBaron for: Computer support; software questions
What is Industrial Engineering?

Industrial engineers are concerned with improving organized activity. The physical arrangement of people, equipment, and material significantly influences the effectiveness of any organization – whether the organization is industrial, governmental, or commercial.

Today’s industrial engineers develop applications of new processing automation and control technology; install data processing systems, performance measures and standards, job evaluation and wage and salary programs; research new products and product applications; devise ways to improve productivity through application of technology and human factors; select operating processes and methods to accomplish a given task using proper tools and equipment; design facilities, management systems, operations procedures, storage systems; improve allocation of resources, planning and control systems for distribution of goods and services, production, inventory, quality and plant maintenance; enhance plant environment and the quality of working life; evaluate reliability and quality performance; implement office systems, procedures, and policies; analyze complex business problems through operations research; conduct long-range organization studies, plant location surveys, system effectiveness studies; and study potential markets for goods and services, raw material sources, labor supply, energy resources, financing and taxes.

Industrial engineers integrate engineering skills with mathematics and computer science tools, providing systematic ways to maximize productivity and quality while minimizing time and cost.

The goal of the Industrial Engineering Undergraduate Program at the University of Arkansas is to prepare men and women for professional careers and graduate studies in Industrial Engineering. We provide a foundation in mathematics, science, humanities and social sciences, engineering science, and engineering design to produce Industrial Engineers with the intellectual, technical, and professional competence to develop, implement, and manage industrial engineering solutions to complex problems in industry, government, and society.

Facilities

The Department of Industrial Engineering is located in the southeast corner of Bell Engineering Center on the fourth floor. The main office suite is Bell 4207, where the offices of the Department Head, the departmental secretary, accountant, and the administrative assistant to the Department Head are located. Faculty offices are located in a hallway across from the departmental suite.

There is a large lounge adjacent to the departmental offices located on the fourth floor that overlooks the atrium; it is officially referred to as The Imhoff Study Center. The room is furnished with tables, chairs and couches and students are encouraged to use this area for a study lounge. The lounge is also often used for student meetings, luncheons and company presentation sessions. In addition to departmental and faculty offices, the other areas located on the fourth floor are part of the departmental layout are two student computer labs (4128 & 4133), a robotics lab (4134C), and new in Fall 2014 a Methods and Standards/Ergonomics Lab (4131). The Department also furnishes offices for those graduate students who are awarded assistantships. These offices are the glass walled areas that over look the atrium are directly across from the departmental suite on the fourth floor. The student office for the IIE and Alpha Pi Mu chapters is located on the fourth floor on the west side of the building (BELL 4142).

The Department has provided student “mail” boxes located in the hallway between the departmental offices and the faculty hallway. These units are labeled with names of currently enrolled students and are utilized by the department as well as the students for placement of departmental announcements, returned homework, phone messages, and other notices that serve the student interests. Students are encouraged to check their mailbox for content at least once a week.
History of the Industrial Engineering Department

In 1949 plans were announced to offer the Bachelor of Science degree in Industrial Engineering. Working with Business Administration, advanced BA students in Industrial Management were given the opportunity to take additional engineering courses to qualify for the new degree. Dr. John Imhoff was hired as head of the department in 1951, coming from the IE option in the ME Department at the University of Minnesota where he had coordinated the program.

The department received full accreditation on its first attempt, as well as campus and national recognition for its outstanding student professional and honor society chapters. It started an effective MS program, played a leadership role in national Industrial Engineering developments through faculty offices at the national level in the AIIE and Alpha Pi Mu, and developed a reputation for close faculty-student relationships.

The outstanding faculty assembled during the latter part of the 60’s set the stage for very rapid growth and achievement. The MSOR degree was designed to add an IE overlay to science graduates in mathematics, chemistry, physics and other disciplines. Another important graduate program developed by the department during the 70’s was the Operations Management program. The program has been one of the largest MS degree granting units at the U of A for many years.

In 1986, Dr. Eric Malstrom, a Purdue University graduate, was hired as Department Head. One of Dr. Malstrom’s first priorities as the new department head was to establish rapport with the newly formed Arkansas Academy of Industrial Engineering. The year 2000 brought the unexpected death of Dr. Malstrom, in the wake of the loss, Dr. John English stepped up to take the role of Department Head.

During Dr. English’s tenure the department continued its growth with the undergraduate program more than doubling. The growth brought new challenges and most specifically, the focus was on retention. With the help of Dr. Richard Cassady, the new Freshman Engineering Program (FEP) was developed so that all freshman engineering students would have a common first year experience. This helped sustain the growth over the next several years.

In 2007 Dr. English accepted a position at Kansas State University, serving as their dean of engineering. The search for a new department head brought Dr. Kim LaScola Needy to the department. Dr. Needy’s enthusiasm and passion for industrial engineering helped the department to continue its excellence in engineering education and research, and to improve the national ranking of the program at the University of Arkansas. Through the development and implementation of a Strategic Plan and with Dr. Needy’s leadership, the department moved forward gaining positive national visibility.

In fall of 2014 the Provost tapped Dr. Needy for the position of Dean of the Graduate School and International Education. The search for a new Department Head resulted in first an interim position as Department Head for Dr. Ed Pohl, followed by the permanent assignment.

Dr. Pohl brings a wealth of expertise and experience from his twenty years in the United States Air Force (Lt. Col., Retired) including serving as the Deputy Director of the Operations Research Center at the United States Military Academy. At the University of Arkansas his leadership skills are highly valued. He is the Director of the Center for Innovation in Healthcare Logistics (CIHL) and the Director of Distance Education for the College of Engineering. He previously served as Director for the successful graduate degree program for the Master of Operations Management (MSOM). His appointment as Department Head will surely secure the department’s future as a national leader in industrial engineering education and research.

Arkansas Academy of Industrial Engineering

The Arkansas Academy of Industrial Engineering (AAIE) was established in 1986 to recognize the achievements of University of Arkansas IE graduates and to provide continuing guidance and support to the Department of Industrial Engineering.

With a membership comprised of distinguished alumni, the AAIE has enabled the department to award many student scholarships since 1995. Some other aspects of support provided by AAIE are evidenced through the A4U (formerly SHUR, Students Helping Undergrad Retention). This is a program led by the members of the academy and industrial engineering students. A4U provides mentoring, tutoring and social activities to new students to aid with retention and help ensure the student’s success.

The academy also provides industrial engineering students with an opportunity to participate in annual mock interviews and a resume writing workshop. This exercise offers upcoming graduates a chance to interview with industry representatives and receive important instruction on best interview practices.
IE Program Educational Objectives

Within 3-5 years of graduation, graduates of the U of A undergraduate program in industrial engineering will have:

1. Successfully applied core industrial engineering knowledge and skills for industrial or public sector organizations
2. Successfully pursued advanced professional degrees, graduate studies in industrial engineering, professional training, or engineering certification
3. Demonstrated professional and intellectual growth as managers and leaders in industrial engineering, society, and their communities.

IE Student Outcomes

IE Student Outcomes represent and describe areas of knowledge or skill that our students can possess and should be able to demonstrate before graduation as a result of their learning experience within our curriculum.

a) An ability to apply knowledge of mathematics, science, and engineering
b) An ability to design and conduct experiments, as well as to model, analyze, and interpret data within Industrial Engineering practice
c) An ability to design a system, component, or process to meet desired needs
d) An ability to function on multi-disciplinary teams
e) An ability to identify, formulate, and solve unstructured Industrial Engineering problems
f) An understanding of professional and ethical responsibility
g) An ability to communicate effectively through written reports and oral presentations to stakeholders within Industrial Engineering problem domains
h) The broad education necessary to understand the impact of engineering solutions in a global and societal context
i) A recognition of the need for, and an ability to engage in life-long learning
j) A knowledge of contemporary issues
k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
l) An ability to improve, and manage integrated systems of people, technologies, material, information, and equipment
m) An ability to utilize the methodologies, computational skills, and analysis techniques of Industrial Engineering practice including such core Industrial Engineering topics as probability, statistics, engineering economics, human factors, engineering management, computing, and operations research applied to manufacturing, logistics, or service systems

Admittance into the IE Undergraduate Program

Engineering students choose a major in the spring semester of their freshman year. To be admitted into the IE Undergraduate Program, Freshman Engineering students must have completed each required course in the Freshman Engineering Academic Program with a University of Arkansas cumulative GPA of 2.0. Students who have not completed MATH 2554 Calculus I are advised by the Freshman Engineering Program. These students are required to enroll in the courses necessary to complete their FEP requirements; however, they can also enroll in industrial engineering courses for which they have the pre-requisites.

Transfer students desiring to enroll in the IE Undergraduate Program are handled on a case-by-case basis. Generally, the student’s transfer course work must fulfill the requirements of the Freshman Engineering Program in order to be admitted into the IE Undergraduate Program.

Curriculum

The plan of study found on the next page contains the list of courses required for the Bachelor of Science in Industrial Engineering degree and a suggested sequence. Our plan of study is designed to be completed within four years. We strongly encourage students to develop a four-year plan, but we recognize that due to scheduling, cooperative education, fiscal necessity, or academic reasons students may voluntarily opt to take less than full course loads each semester. It is the primary responsibility of the student to make progress towards meeting the degree requirements in a timely manner. Some courses are offered only once a year so students who deviate from the suggested sequence must pay careful attention to course scheduling and course prerequisites.

How do I register for my courses?

• Develop a preliminary schedule for the next term using the BSIE Eight-Semester Plan on the next page as a guide. Classes offered for the next term can be found by logging in to your UAConnect account or by viewing the online Schedule of Classes, http://registrar.uark.edu/registration/schedule-of-classes.php.
• UAConnect’s “Schedule Planner” tool is very useful in developing feasible schedules. Online Schedule Planner help guides and videos are available.
• Schedule an appointment with your advisor using UASuccess, which is accessed by logging into Blackboard Learn at https://learn.uark.edu/. Come prepared for your appointment by bringing a list of classes you plan to take the next term. Your advisor will guide you on course selection and will release your advising hold in UAConnect.
• Logon to UAConnect and select your classes.

The following section contains the recommended plan of study for the Bachelor of Science in Industrial Engineering degree and a suggested sequence. It is strongly recommended that students maintain an individual semester-by-semester plan that takes them to graduation. This plan can be reviewed and adjusted, as needed, at each advising meeting.

At least 12 hours of technical electives must be selected from INEG courses.
Industrial Engineering B.S.I.E. Eight-Semester Degree Program

Plan of Study

This is the recommended plan of study for students entering the Department of Industrial Engineering in Fall 2017 or later, and includes the new four-hour course INEG 3714 Work Methods and Ergonomics (see curriculum changes effective Fall 2018). If you entered the department before Fall 2017, you may be on a different plan of study that can be found at www.industrial-engineering.edu under “Current Student Resources.” See your advisor if you have any questions.

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<th>Semester</th>
<th>Courses</th>
<th>Credits</th>
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<td>GNEG 1111 Intro. to Engineering I ...........................................</td>
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<td>MATH 2554 Calculus I ........................................................................</td>
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<td>CHEM 1103 Univ. Chemistry I† ..........................................................</td>
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<td>PHYS 2054 Univ. Physics I ....................................................................</td>
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<td>ENGL 1013 Composition I .......................................................................</td>
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<td>Third Semester</td>
<td>INEG 2001 IE Seminar (Fall Only) .....................................................</td>
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<td>INEG 2103 Intro. to Industrial Engineering (Fall Only) ........................</td>
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<td>INEG 2313 Appl. Prob. &amp; Statistics for Engineers I .............................</td>
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<td>INEG 2413 Engineering Economic Analysis .........................................</td>
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<td>MATH 2574 Calculus III ........................................................................</td>
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<td>Fifth Semester</td>
<td>INEG 3623 Simulation (Fall Only) ........................................................</td>
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<td>INEG 3714 Work Methods and Ergonomics ............................................</td>
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<td>Technical Elective (3) .........................................................................</td>
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<td>ELEG 3903 Electric Circuits and Machines .........................................</td>
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<td></td>
<td>Fine Arts (From University/State Core) ............................................</td>
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<td>Seventh Semester</td>
<td>INEG 4433 Systems Eng &amp; Mgnt (Fall Only) ...........................................</td>
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<td>INEG 4553 Prod. Plan &amp; Control (Fall Only) .........................................</td>
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<td>INEG 4911 IE Capstone Experience I (Fall Only) ...................................</td>
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<td>Social Science (From University/State Core) ......................................</td>
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<td>Second Semester</td>
<td>GNEG 1121 Intro. to Engineering II ...................................................</td>
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<td>MATH 2564 Calculus II ..........................................................................</td>
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<td>Freshman Science Elective† ................................................................</td>
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<td>INEG 1033/1023 Tech. Composition II ................................................</td>
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<td>HIST 2003, HIST 2013 or PLSC 2003 ....................................................</td>
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<td>Fourth Semester</td>
<td>INEG 2333 Appl. Prob. &amp; Statistics ....................................................</td>
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<td>for Engineers II ..................................................................................</td>
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<td>INEG 2403 Industrial Cost Analysis (Spring Only) ................................</td>
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<td>CSCE 2004 Programming Foundations I ................................................</td>
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<td>MEEG 2303 Intro. to Materials ................................................................</td>
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<td>MATH 2584 Elem. Diff. Equations .......................................................</td>
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<td>Sixth Semester</td>
<td>INEG 3513 Manufacturing Processes (Spring Only) ..................................</td>
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<tr>
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<td>INEG 3613 Introduction to OR ................................................................</td>
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<td></td>
<td>Technical Elective (3) .........................................................................</td>
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<td></td>
<td>MEEG 3003 Statics ................................................................................</td>
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<td>ECON 2143 or (ECON 2013 and ECON 2023) ..........................................</td>
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<tr>
<td>Eighth Semester</td>
<td>INEG 4923 IE Capstone Experience II (Spring Only) ................................</td>
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</tr>
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<td></td>
<td>Humanities (From University/State Core) ...........................................</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social Science (From University/State Core) ......................................</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong> ............................................................................................</td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

126 credits – minimum required for graduation

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1 CHEM 1113 Univ. Chemistry for Engineers I or CHEM 1213 Chemistry for Majors I are suitable substitutes
2 CHEM 1123/1121L Univ. Chemistry II or PHYS 2074 University Physics II
3 If the student selected CHEM 1123/1121L as their freshman science elective then this must be PHYS 2074 University Physics II; otherwise please see the approved list of IE science electives.
Recent Changes Within the Curriculum

Effective Fall 2018
1. INEG 3713 Methods and Standards and INEG 3723 Ergonomics are combined into a new four-hour class, INEG 3714 Work Methods and Ergonomics. The total credit hours for the BSIE is reduced from 128 to 126.
2. Prerequisites for INEG 4911 and INEG 4923 are changed to allow more co-requisites and more strongly enforce some pre-requisites.
3. No more than four credit hours (as opposed to three) may be based in Honors Thesis. Honors Thesis courses include INEG 400VH and two new courses, INEG 3812H and INEG 4812H.

Effective Fall 2017
1. MATH 3013 is not an approved technical elective.

Effective Fall 2016
1. INEG 4904 will be offered for the final time in the fall semester of 2016. INEG 4911 will be offered for the first time in the second eight weeks of the fall semester of 2016, and INEG 4923 will be offered for the first time in the spring semester of 2017. INEG 4911 (fall only) and INEG 4923 (spring only) must be taken in consecutive semesters.
2. INEG 4723 is changed to INEG 3723.
3. The requirement for either MEEG 2403 Thermodynamics or CHEG 2313 Thermodynamics of Single Component Systems is replaced with MEEG 2303 Introduction to Materials.
4. INEG 2513 Manufacturing Design is replaced by INEG 3513 Manufacturing Processes, which has a prerequisite of MEEG 2303.

Effective Fall 2015
1. INEG 2333 Applied Probability and Statistics for Engineers II is now a pre-requisite for INEG 4323 Quality Engineering & Management (instead of senior standing).
2. The approved technical elective course list has changed (see page 13).

Effective Fall 2014
1. INEG 2333 Applied Probability and Statistics for Engineers II is now a pre-requisite for INEG 4553 Production Planning and Control.
2. INEG 2413 Engineering Economic Analysis is now a pre-requisite for INEG 3623 Simulation.
3. The pre-requisites for INEG 3613 Introduction to Operations Research are now MATH 2574 Calculus III and INEG 2103 Introduction to Industrial Engineering.
# Required Courses and Their Pre-Requisite Courses

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Required Courses</th>
<th>Pre-Requisite Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNEG 1121</td>
<td>Intro. to Engineering II</td>
<td>GNEG 1111 Intro. to Engineering I</td>
</tr>
<tr>
<td>ENGL 1023/1033</td>
<td>Technical Composition II</td>
<td>ENGL 1013 Composition I</td>
</tr>
<tr>
<td>MATH 2564</td>
<td>Calculus II</td>
<td>MATH 2554 Calculus I with a C or better</td>
</tr>
<tr>
<td>MATH 2574</td>
<td>Calculus III</td>
<td>MATH 2564 Calculus II with a C or better</td>
</tr>
<tr>
<td>MATH 2584</td>
<td>Elementary Differential Equations</td>
<td>MATH 2564 Calculus II with a C or better</td>
</tr>
<tr>
<td>PHYS 2054</td>
<td>University Physics I</td>
<td>(pre/corequisite) MATH 2554 Calculus I</td>
</tr>
<tr>
<td>PHYS 2074</td>
<td>University Physics II</td>
<td>PHYS 2054 University Physics I, (pre/corequisite) MATH 2564 Calculus II</td>
</tr>
<tr>
<td>CSCE 2004</td>
<td>Programming Foundations I</td>
<td>MATH 2554 Calculus I with a “C” or better</td>
</tr>
<tr>
<td>ELEG 3903</td>
<td>Electric Circuits and Machines</td>
<td>PHYS 2074 University Physics II, MATH 2564 Calculus II</td>
</tr>
<tr>
<td>MEEG 2003</td>
<td>Statics</td>
<td>PHYS 2054, (pre/corequisite) MATH 2574 Calculus III</td>
</tr>
<tr>
<td>MEEG 2303</td>
<td>Intro. to Materials</td>
<td>PHYS 2054 University Physics I, MATH 2554 Calculus I, and CHEM 1103 University Chemistry I</td>
</tr>
<tr>
<td>INEG 2313</td>
<td>Appl. Prob. &amp; Stat. For Eng. I</td>
<td>MATH 2564 Calculus II</td>
</tr>
<tr>
<td>INEG 2413</td>
<td>Engineering Economic Analysis</td>
<td>MATH 2554 Calculus I</td>
</tr>
<tr>
<td>INEG 3513</td>
<td>Manufacturing Processes</td>
<td>MEEG 2303 Intro. to Materials</td>
</tr>
<tr>
<td>INEG 3613</td>
<td>Introduction to Operations Research</td>
<td>INEG 2103 Intro. to Industrial Engineering, MATH 2574 Calculus III</td>
</tr>
<tr>
<td>INEG 3714</td>
<td>Work Methods and Ergonomics</td>
<td>INEG 2333 Appl. Prob. &amp; Stat. for Eng. II (pre/corequisite)</td>
</tr>
<tr>
<td>INEG 4433</td>
<td>Systems Engineering and Management</td>
<td>INEG 2403 Industrial Cost Analysis</td>
</tr>
<tr>
<td>INEG 4911</td>
<td>Industrial Engineering Capstone Experience I</td>
<td>(pre/corequisite) INEG 2001, INEG 3613, INEG 3623, INEG 3714, INEG 4433, and INEG 4553.</td>
</tr>
<tr>
<td>INEG 4923</td>
<td>Industrial Engineering Capstone Experience II</td>
<td>INEG 3613, INEG 3623, INEG 4911 (Must be taken in the preceding semester.) (pre/corequisite) INEG 3513</td>
</tr>
</tbody>
</table>
Technical Elective Requirements

The purpose of technical electives is to provide students with the opportunity to expand their education along lines of particular interest to them. Each student is responsible for his or her technical elective program. Students may seek specific advice on technical elective selections from their advisor. Courses satisfying technical elective requirements cannot fulfill more than one industrial engineering degree requirement.

A minimum of 18 credit hours from the approved technical elective course list must be taken to satisfy technical elective requirements within the Industrial Engineering program. At least 12 of these 18 credit hours must be chosen from INEG courses. No more than 3 of these credits may be based in individual/independent study, no more than 4 of these credits may be based in honors thesis (honors thesis courses offered by our department include: INEG 400VH, INEG 3812H and INEG 4812H), and no more than 3 of these credits may be based in cooperative education.

Approved Technical Elective Course List

1. Any BENG, BIOL, BMEG, CHEG, CHEM, CVEG, CSCE, ELEG, GNEG, INEG, MATH, MEEG, and PHYS course that is at the 3000 level or above and not required for the BSIE is approved.

Exceptions are:

- GNEG 3801 is not approved.
- GNEG 3811 is approved only if the student has completed at least three semesters of GNEG 3811.
- CVEG 4513 is not approved if the student is also seeking technical elective credit for INEG 4443.
- MATH 3013 and MATH 3133 are not approved.
- PHYS 3603, 4103, and 4203 are not approved.

2. Courses at the 3000 level or above that are explicitly listed (not part of a blanket statement like "... 3000-to-4000-level . . .") in the Catalog of Studies under Minors for Non-Business Students4 are approved.

Exceptions are:

- ISYS 3393 is not approved if the student is also seeking technical elective credit for INEG 4683.

3. Courses at the 3000 level or above that are explicitly listed on the Sustainability Minor Courses website5 under Natural, Managed, or Built Systems are approved.

4. Additional approved courses are CSCE 2014, EXSC 3153, and EXSC 3353.

Basic Science Elective List

The basic science elective is recommended for the second semester of the freshman year. Some courses require a laboratory experience and others do not.

- ASTR 2003 Survey of the Universe
- BIOL 1543 Principles of Biology
- BIOL 2213 Human Physiology
- CHEM 1123 University Chemistry II
- GEOS 1113 General Geology I

Humanities and Social Sciences Requirements

Every student in the College of Engineering is required to complete a minimum of 18 semester hours in the humanities and social sciences. INEG’s 18 hours of Humanities and Social Sciences requirements include:

1. HIST 2003 or HIST 2013 or PLSC 2003
2. ECON 2143 Basic Economics or (ECON 2013 and ECON 2023)6
3. Fine Arts (From University/State Core List)
4. Humanities (From University/State Core List)
5. Social Science (From University/State Core List)
6. Social Science (From University/State Core List)

University/State Core List is provided in the appendix

Supply Chain Engineering Emphasis Area

Students who are completing a BS in Industrial Engineering may elect to complete an emphasis in supply chain engineering by completing 12 credit hours of relevant coursework. Students may also be able to count some or all of these courses toward technical elective requirements. The requirements for the Supply Chain Engineering Emphasis Area are as follows:

1. Students must take the following courses:

- INEG 4543 Facility Logistics or INEG 5543 Distribution Center Design & Operations
- INEG 4633 Transportation Logistics

2. In addition, students must complete two courses from the following list:

- INEG 4383 Risk Analysis for Transportation and Logistics Systems
- INEG 4593 Manufacturing Systems
- INEG 4683 Decision Support in Industrial Engineering
- INEG 4833 Introduction to Database Concepts for Industrial Engineers
- INEG 5313 Engineering Applications of Probability Theory
- INEG 5323 Engineering Applications of Stochastic Processes
- INEG 5613 Introduction to Optimization Theory
- any SCMT course on the approved list of technical electives

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4 https://catalog.uark.edu/undergraduatecatalog/collegesandschools/sammwalltoncollegeofbusiness/minors/ as of 02/01/2018
5 https://catalog.uark.edu/undergraduatecatalog/collegesandschools/interdisciplinarystudies/sustainabilitysustm/ as of 02/01/2018
6 If both ECON 2013 Principles of Macro Economics and ECON 2023 Principles of Microeconomics are taken, they will fulfill the requirements for both ECON 2143 and a Social Science Elective
3. Students must earn a C or better in each of the courses taken for the supply chain engineering emphasis.

4. After completing the coursework requirements, students must complete and submit (to the Department of Industrial Engineering) “Supply Chain Engineering Emphasis Area Request Form” (located in the back of this handbook).

Transfer Credit

Transfer credits are subject to a two-stage evaluation process at the university, as described in the Catalog of Studies. Credits found to be eligible for general transfer may not necessarily count toward the requirements for a BSIE. Transfer students entering the industrial engineering department will meet with their advisor to determine which transfer credits satisfy degree requirements. The Associate Department Head will evaluate any new transfer classes and resolve questions on how credits will be applied to the BSIE. Some transfer course decisions will be evaluated by the Undergraduate Studies Committee. Results of these evaluations will be reflected on the student’s degree check form and in the UAConnect Degree Audit system, and written documentation of the decision will be maintained in the department.

Current students wishing to take a course at another college, transfer the course and have it apply to the BSIE should ensure BEFORE they take the course that it transfers as the exact course number needed. This can be done using the online transfer course equivalency website: https://courseequivalency.uark.edu/. Refer any questions to your academic advisor.

Petitioning the Undergraduate Studies Committee

Course substitutions are processed depending on the nature of the required course. Substitutions for courses required by the College are requested via student petition to the College Curriculum Committee. Substitutions for courses required by the Department are requested via student petition to the Department’s Undergraduate Studies Committee.

Possible Reasons to Petition:
1. Request approval of non-approved technical electives
2. Request approval of non-approved engineering science electives
3. Request approval of non-approved science electives
4. Request substitution of a course for a required IE course only under extra-ordinary circumstances
5. Request approval of transfer courses

How to Petition
1. Speak to your advisor concerning the petition
2. If your advisor recommends proceeding, then email your petition to the current Chair of the IE Undergraduate Studies Committee, Dr. Richard Cassady (cassady@uark.edu).

3. Your petition should include the following
   a. Name and student number
   b. Date of petition
   c. Current academic rank
   d. Expected year and semester of graduation
   e. Description of petition request
      i. Brief description of what you want the committee to consider
      ii. The course descriptions of the courses involved in the petition
      iii. The committee may ask you to supply syllabi if necessary to the decision
      iv. If you are petitioning for a technical, computer, engineering science, or science electives, please give your other pertinent electives in the same area.
      f. A date by which you must have the decision

Remarks

1. We generally do not give approval to courses that you have already taken and that you now want to substitute. Petition before you take the course, not after!
2. The approval applies only to the individual student involved in the petition. Just because a petition has been approved for one of your friends it does not mean that it also applies to you!
3. MGMT 3563 does not substitute for INEG 4433.

Advising and Registration

During pre-registration for the fall semester of the sophomore year (occurring in March/April of the freshman year), Freshman Engineering students who have declared IE as their major are advised by the Undergraduate Academic Advisor, who will assist students in selecting appropriate courses from the departmental curriculum.

Academic Advising for all IE students is done during September/October for the following spring registration and during February/March for the following summer/fall registration. Important: Students must schedule an advising appointment using the online tool in UASuccess and come prepared for their advising appointment by bringing a list of classes they plan to take in the following term(s). Use the appropriate eight-semester plan as a guide. The advisor will check prerequisite requirements and counsel the student on selection of courses. Academic advisors clear a student’s advising hold in UAConnect only after his/her study plan has been reviewed and approved. Students are then able to enroll in courses online using the UAConnect registration system, but only on or after the enrollment date indicate in the student’s UAConnect account. See the “How do I register for my courses?” section of this handbook (page 9) for further information.
Degree Checks and Graduation Requirements

Upon admission to the industrial engineering program, a degree check form is created for the student. The degree check form indicates which requirements the student has completed towards their degree program. Before each semester’s advising period, the degree check is updated based on the student’s completed course work. The degree check form is used by advisors and students to understand what program requirements are remaining. The student degree check form should agree with the information in the Degree Audit, which can be accessed through the student UAConnect account.

The definitive source for student graduation requirements is the University of Arkansas Catalog of Studies. Graduation requirements are specified at the university, college, and department level. The student is responsible for understanding and checking that the appropriate graduation requirements for their situation are being met. The Catalog of Studies delineates such procedures and requirements as:

- Grades and Marks
- Undergraduate Grade Forgiveness Policy
- Academic Probation, Suspension, and Dismissal
- Graduation Requirements

Note: There is a limit on the number of “D” hours that can be applied toward a degree. For students entering the college in fall 2014 or later, only 8 hours of “D” credit can be applied to a BSIE.

When a student is approximately one year from their anticipated graduation date, he/she should contact their advisor and request a degree review. The purpose of this degree review is to determine those course requirements needed for graduation. In case of disputes and/or disagreements regarding credit, requirements, and/or curricula, appeal is to the Department’s Undergraduate Studies Committee.

Graduation

Application Deadlines:

- Spring – March 1
- Students must apply by the deadline to be included in the spring commencement program.
- Summer – July 1
- Fall – October 1
- Students must apply by the deadline to be included in the fall commencement program.

How do I apply to graduate?

You apply to graduate through your Student Center in UAConnect. The link will appear in your Student Center in the Academics section, there is a drop down box – select “Apply for Graduation.” At the “Submit an Application for Graduation” page, note the current degree and major listed on our records. If this information is incorrect you will need to stop your application and contact the Dean’s Office to have it corrected. If you do not see the “Apply for Graduation” link beside your current degree major and minor you have not earned enough hours to apply for graduation.

When applying for graduation, your “graduation term” is the term in which you complete all required coursework. For example, if you will complete your coursework in the summer, but wish to participate in the spring commencement, you may do so. However, you will have a spring commencement and a summer graduation date.

Please note your diploma will be sent six to eight weeks following the last day of classes.

For more information please see “Applying To Graduate” at the Registrar’s website: http://registrar.uark.edu/graduation/applying-to-graduate.php

Requirements to Graduate with Distinction

INEG students who have not completed the INEG Honors Program but have demonstrated excellent academic performance will be recognized at graduation by the designation of “with distinction”, “with high distinction”, or “with highest distinction”. To earn these designations, the student must meet the following criteria on their University of Arkansas coursework:

1. The student must have completed at least one-half of his or her degree work at the University of Arkansas.
2. For “with distinction”, the student must achieve a GPA of 3.60 or higher.
3. For “with high distinction”, the student must achieve a GPA of 3.75 or higher.
4. For “with highest distinction”, the student must achieve a GPA of 3.90 or higher

Code of Ethics’

Students in the College of Engineering should be committed to the highest ethical and professional conduct. You are encouraged to be honest, impartial, fair, and equal in all of your dealings with fellow students and faculty. Unethical conduct undermines the pursuit of the educational goals of this institution and erodes the honor, ability, and reputation of its graduates.

Every student in the College of Engineering is obligated to comply with pertinent provisions of the Code of Ethics applicable to professional practice following graduation. The Code requires “honesty, impartiality, fairness, and equity,” and “adherence to the highest principles of ethical conduct.” Most particularly, it states that engineers shall:

1. Be objective and truthful in professional reports, statements, or testimony,
2. Not falsify or permit misrepresentation of their academic or professional qualifications,
3. Give credit for engineering work to those whom credit is due,
4. Not compete unfairly with other engineers by

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7 The material in this section can also be found in University of Arkansas, Catalog of Studies, College of Engineering, College Academic Regulations, Code of Ethics, http://catalog.uark.edu/undergradcatalog/collegesandschools/collegeof/engineering/
5. Avoid any act tending to promote their own interest at the expense of the dignity and integrity of the profession.

Pursuant to these provisions, the faculty of the College of Engineering considers the following to be specific examples of unethical conduct:

1. Submission, as one’s own, of any work prepared totally or in part by someone else.
2. Plagiarism, i.e., the unacknowledged incorporation of another person’s work, either verbatim or in substance, in work submitted for credit.
3. Unauthorized collaboration with another person in preparing work submitted for credit.
4. Unauthorized submission, for credit, of work previously credited in another course.
5. Unauthorized alteration of work submitted for re-grading.
6. The use of unauthorized materials or aids during examinations.
7. Copying from the examination paper of another student or giving aid to, or seeking aid from, another student during an examination.
8. Using, obtaining, or attempting to obtain by any means the whole or any part of an un-administered examination, or of information pertaining thereto.
9. Taking, or attempting to take, an examination for another student, or allowing another student to take or attempt to take an examination for oneself.
10. Any conduct expressly stated to be unethical by the instructor in a particular course.
11. Aiding, abetting, or condoning unethical conduct on the part of another student.

Strict adherence to the foregoing Code of Ethics is a requirement for graduation from the College of Engineering. The complete College of Engineering Policy on Academic Ethics is included in the Catalog of Studies.

Changes to the Curriculum

Students are expected to keep informed concerning current regulations, policies, and program requirements in their fields of study and must meet all requirements of the degree programs in which they are enrolled. Courses that are modified or added to a curriculum and that are incorporated into the curriculum at a level beyond that at which a student is enrolled may become graduation requirements for that student. Courses that are incorporated into the curriculum at a level lower than the one at which the student is enrolled are not required for that student.8

Engineering is a rapidly changing profession, and the departmental curricula are updated continuously to keep pace with these changes. Students entering under a particular Catalog of Studies will be required to comply with such curriculum changes to earn their degree. However, the total number of semester hours required for the degree may not be increased, and all work completed in accordance with their catalog of studies prior to the curriculum change will be applied toward the student’s degree requirements. Former students of the college must meet the curriculum requirements in effect at the time of their readmission.9

If you feel that a change in the curriculum will delay your planned graduation date then you may petition the Undergraduate Studies Committee to consider your case. By “delay graduation,” we mean that the student cannot configure another reasonable schedule in order to meet the IE Degree requirements in order to graduate by their planned graduation date. An unreasonable schedule would, for example, include a course loading above that recommended in the published IE plan of study for the semester of graduation or the semester prior to graduation. The consent of the instructor is required to waive a prerequisite for a course; the Undergraduate Studies Committee can only recommend that the prerequisite be waived.

Cooperative Education and Internships

Cooperative education (co-ops) and internships are full-time or part-time experiential programs which allow students to gain engineering work experience prior to graduation. The majority of IE students participate in one or more co-ops or internships before they graduate, gaining IE-related experience locally, within the state, across the nation, and internationally. Co-ops and internships integrate academic and professional experiences; students who participate learn not only about the engineering field, but also about being a professional and navigating the politics of a new work environment. Co-ops and internships provide the opportunity to apply what you are learning in the classroom, to clarify your career goals, and to build a valuable professional network.

What is the difference between a co-op and an internship? Although many people use the terms interchangeably, the College of Engineering classifies the work experience as a co-op if the student is receiving academic credit. This can be for a part-time or full-time experience. It is classified as an internship if the student is not receiving academic credit. Students receive one hour of credit for each term (Fall, Spring or Summer) for which he/she registers for a co-op course. Students register for GNEG 3801 for part-time work and register for GNEG 3811 for full-time work.

Note: Three hours of GNEG 3811 (full-time co-op credits) can count as a non-INEG technical elective. GNEG 3801 hours (part-time co-op credits) do not count towards your IE degree.

Requirements to participate in engineering co-op courses and certain restrictive conditions are detailed in the U of A Catalog of Studies at http://catalog.uark.edu/. The College of Engineering has an excellent website that can assist students in registering for co-op classes and

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8 Catalog of Studies, College of Engineering Academic Regulations http://catalog.uark.edu/undergraduatecatalog/collegesandschools/collegeofengineering/
9 Catalog of Studies, College of Engineering Degree Requirements http://catalog.uark.edu/undergraduatecatalog/collegesandschools/collegeofengineering/
provide valuable information on finding and succeeding in both co-ops and internships: http://engineering.uark.edu/academics/undergraduate-students/professional-success/cooperative-education-overview.php.

**Study Abroad Opportunities**

Opportunities exist for Industrial Engineering students to enhance their educational experience by spending a summer, semester, or year immersed in another culture while working towards completion of their degree. The Study Abroad program is administered through the Office of Study Abroad and International Exchange. For more information about study abroad education opportunities refer to the website http://studyabroad.uark.edu/

The John L. Imhoff Global Studies Endowment was established to support academic scholarships to assist in defraying the expenses for industrial engineering students while engaged in for-credit overseas study and/or overseas work experience defined as internships and cooperative work programs. Students interested in applying for support through the John L. Imhoff Global Studies Endowment should contact Dr. Ed Pohl at 575-6029 or e-mail him at epohl@uark.edu. Application requirements/dates will be announced.

**Minors**

Industrial Engineering students may pursue an academic minor in other colleges. Minors in mathematics and business are popular among engineering students, but there are many options. Students must notify the College of Engineering Office of Student Records, BELL 3189, of their intent to pursue a minor. Requirements for minors are found in the Catalog of Studies.

**Departmental Scholarships**

The Department of Industrial Engineering awards scholarships to incoming sophomores and currently enrolled students during the spring semester for the next academic year. For information about these scholarships, contact the office staff.

**The Industrial Engineering Honors Program**

The INEG Honors Program is an optional program designed for INEG undergraduates who are also enrolled in the University of Arkansas Honors College.

This program is designed to give honors students the opportunity to pursue unique coursework opportunities and research experiences. Participation in, and completion of, the INEG Honors Experience is optional.

Students interested in the Honors Program should contact Dr. Kelly Sullivan at 575-2563 or email him at ksullivan@uark.edu prior to completing 100 semester hours.

Honors students have the option to participate in the Honors Research Experience for Industrial Engineers (HREIE) course curriculum, which consists of a sequence of three 2-credit courses to be taken in the sophomore, junior, and senior years (INEG 2812H, INEG 3812H and INEG 4812H). The aims of the curriculum are to (i) pair students with a research topic and faculty mentor early in a student’s undergraduate career, (ii) assist students through the process of submitting a research proposal, and (iii) guide students through the process of conducting and disseminating their research. In the process, a focus is given to developing students’ writing and presentation skills via incorporating frequent peer review and critique of each other’s work. Honors students who do not participate in the HREIE typically take INEG 400VH with their thesis advisor during their junior or senior year.

**College of Engineering Requirements**

Admission requirements for the Engineering Honors Program are as follows:

- Entering freshmen must have at least a 3.5 high school GPA and at least 28 composite score on the ACT.
- Entering transfer students must have a 3.5 GPA on their transfer work.
- Students not qualifying for the Engineering Honors Program initially are eligible after one semester if they earn at least a 3.5 GPA.
- The "Honors Thesis/Project Proposal Form" must be submitted to the Engineering Dean’s Office (BELL 3189) prior to a student earning 100 semester hours.

Students must formally apply for admission to the Engineering Honors Program. Once accepted into the program, Honors students must:

1. Take a minimum of 12 hours of Honors courses
   a. A minimum of 6 of these 12 hours must be upper-level engineering courses. The available engineering honors course options are found in the Industrial Engineering Requirements section below.
   b. For the honors courses outside of engineering, there are many options that will count toward your engineering degree requirements. Many courses on the approved humanities/social science elective list have honors sections available. Calculus and physics honors sections are also available.

2. Participate in undergraduate research and write an undergraduate thesis.

3. Fulfill any additional departmental requirements.

Once a student has been admitted to the Honors Program, that student must maintain a UA cumulative GPA of at least 3.50. If a student’s cumulative GPA drops below 3.50 following either the fall or spring semester, that student will receive a warning by email that they have not met Honors Program requirements. If the student’s cumulative GPA remains below 3.50 for two consecutive semesters (excluding summer sessions), the student will be removed from the Honors Program and instructed that they may reapply once their cumulative GPA is at least 3.50.

**Industrial Engineering Requirements**

To graduate from INEG "with honors", an INEG undergraduate student must, upon completion of his/her degree (B.S.I.E.) requirements,
The student may complete up to four hours from the University of Arkansas or are transferring to another major at the Institute of Industrial and Systems Engineers (IISE) faculty approved by the faculty mentor and a second, full-time member to supervise their research based on common interest. This includes identifying a faculty member to supervise their research based on common interest. The student's individual research effort conducted under the supervision of a full-time member of the INEG faculty. This research may or may not be conducted under the supervision of a full-time member of the INEG faculty. Up to three hours of INEG 411VH can also be counted towards the INEG Technical Elective requirement.

3. The student may take INEG 5000-level courses for honors hours. The student must fill out an Out-of-Career Registration form from the Graduate School, and receive instructor and their advisor’s approval to enroll in the course. These 5000-level courses may count as INEG Technical Electives.

4. The student may take any upper-level engineering honors course for honors hours. Such courses may count as Technical Electives provided they meet the technical elective requirements. These courses will be designated with the H in the Catalog of Studies. A number of honors course sections have been created for both required and elective INEG courses.

The Honors Thesis is a written document that summarizes the student's individual research effort conducted under the supervision of a full-time member of the INEG faculty. This research may or may not be funded by the faculty mentor. It is expected that the student will begin their Honors Thesis no later than their junior year. This includes identifying a faculty member to supervise their research based on common faculty and student interests. The written document and a corresponding oral presentation (defense) must be approved by the faculty mentor and a second, full-time member of the INEG faculty.

Withdrawing From the Department

IE students who are withdrawing from the University of Arkansas or are transferring to another major at the University of Arkansas must make an appointment for an exit interview with the Department Head. Please check with a staff member (Karen Standley, standle@uark.edu)

Inclement Weather Policy

The general policy regarding inclement weather is that the University does not close its offices because of bad weather. However, the obligation to provide services to our students must be balanced with the risk of danger to our employees. It is, therefore, appropriate that guidelines which reflect the needs of our students and the safety of our employees be established and made known.

The complete policy can be viewed here: https://vcfa.uark.edu/policies/fayetteville/vcfa/2100.php

Engineering Registration

Every state, the District of Columbia, and the U.S. territories have laws regulating the practice of professions including law, medicine, and engineering. These laws protect the public health, safety, and welfare by ensuring that those receiving licenses to practice have at least met certain requirements of competence, ability, experience, and character. Registration laws vary from state to state and are exclusively under the control of the individual state legislatures. Generally, the registration laws for professional engineers require graduation from an accredited engineering program, followed by approximately four years of experience, and then the successful completion of a written examination.

Most state laws provide for a pre-registration certificate for those who do not have four years of engineering experience. These are generally known as “Engineers-in-Training” (EIT). The requirements for an EIT are graduation from an accredited engineering program plus the successful completion of an examination of fundamental engineering subjects. The Fundamentals of Engineering (FE) examination is administered each year in April and October. Application deadlines for this exam is typically September 15 and March 1. Engineering students are allowed to take this exam during their senior year. For more information about the FE exam, check with your advisor or a staff member in the IE or Dean’s office.

Activities and Organizations

Outside your academic achievements, you are encouraged to participate in campus social and service groups that meet your interests. The University of Arkansas has a student government organization, student activities sponsored by the UA student union programs, student member clubs, honor societies, and involvement in the planning of campus events, etc. Within the discipline of Industrial Engineering, there is a student chapter of Institute of Industrial and Systems Engineers (IISE) that is comprised of enrolled IE students. Chapter officers, president, vice president, secretary/treasurer, publicity chairman and social chairman are elected each semester. This group is very active with regularly scheduled meetings, fund raising events, community service projects,
Your participation in IISE as a student member will serve to enhance your college experience and improve your post graduation career opportunities.

The IE honor society, Alpha Pi Mu, offers a student mentoring program that aims to integrate new students into the department and equip them for academic and professional success.

Other groups of interest to our students are the Society of Women Engineers, the National Society of Black Engineers, the Society of Military Engineers, the National Society of Hispanic Engineering, and the National Society of Professional Engineers.

- Alpha Pi Mu National Website: https://alphapimu.com/
- Society of Women Engineers: http://societyofwomenengineers.swe.org/
- National Society of Black Engineers: http://www.nsbe.org/
- Society of Military Engineers: http://www.same.org/
- National Society of Hispanic Engineering: http://www.shpe.org/

Career Development Services

The University of Arkansas Career Development Center’s vision is to advance the success of all U of A students and recent alumni by establishing ourselves as the premier university community resource for comprehensive, innovative, and inclusive career services. Our Mission is to empower and educate students through our comprehensive career services, focusing on:

- Counseling - Utilizing a holistic approach to support students as they identify their career path and develop action plans.
- Employer Relations - Forging strong employer relationships to maximize students’ employment-seeking and experiential learning opportunities.
- Career Events - Enhancing student marketability via real-world professional development.

Computers

The Industrial Engineering Department has two computer laboratories for student use. They are equipped with the latest software and specialized programs.

The department is committed to providing the latest in computer technology, software capability, and technical expertise to enhance the educational experience for our students.

Matt Sparks or Garn LeBaron [ineghelp@uark.edu], the departmental computer support specialists, maintain all the departmental laboratories; the labs are accessible in the evenings and on weekends. Students can now access lab computers remotely from any Internet connection with the Citrix Receiver. Further instructions are available on the Industrial Engineering Technology Services website: industrial-engineering.uark.edu/technical-support/it-faq.php

Because it is expensive to replace damaged equipment in these laboratories, the students are asked to respect the facilities property. Ethical behavior is the standard expected from our students whether it is related to performance in the classroom (taking exams) or using laboratory equipment.

Viewing of inappropriate material or the installation of unauthorized software (particularly instant messaging and chat clients), or game playing on the computers are considered to be a violation of Arkansas’ Code of Computing Practice (http://its.uark.edu/policies/code/index.php). The department computer technicians will periodically inspect the lab computers for violations of this policy. Users who are found to be in violation of this policy will lose their account privileges on the Engineering computer network until they resolve the issue with the department head or another approved department faculty or staff member.

Even though having your own personal computer is a good idea for its convenience and time value, you will find that many assignments will require the use of specialized, expensive software that is available only on IE laboratory computers. For this reason, our department does not require that students purchase personal computers.

Laboratories

Lab Rules

- Use of the INEG labs is restricted to students taking Industrial Engineering courses and Industrial Engineering faculty and staff.
- The labs are under 24-hour video surveillance.
- Do not attempt to disable or hinder the security protocols in place.
- Do not prop lab doors open.
- Please do not disturb class sessions that take place in the Labs.
- All users must obey the University’s Code of Computing Practices.
- No food or drinks allowed.

Computers will re-image themselves after each use. Please do not save your data locally on the lab computer. It might not be there when you log in again.
Lab Hours

All INEG General Access Computer Labs are open 24 hours a day throughout the semester to all faculty, staff, and students enrolled in INEG classes with exceptions for scheduled maintenance.

Contact Information:
Matt Sparks - Master Scientific Research Technician or Garn LeBaron – INEG Scientific Research Technician  
E-Mail: ineghelp@uark.edu  
Office: BELL 4134B  
Phone: 575-3547

To report problems or for requests or comments, please send an email to ineghelp@uark.edu describing your issue. This process will automatically create a ticket in the campus ticketing system.

Software
All computer labs feature easy access to the following software:
• ACE Automation Control Environment
• Adobe Acrobat Professional
• AMPL with CPLEX and Gurobi Solvers
• Anaconda and Jupyter Notebooks
• ArcGIS
• Autodesk AutoCAD 2017
• Autodesk Inventor 2017
• Autodesk Netfabb
• CodeBlocks
• Git Bash
• Google Earth Pro
• IBM CPLEX Studio
• LaTeX and TeXStudio
• Microsoft Office Enterprise 2016
• Minitab
• MySQL Workbench
• NetBeans
• Palisade DecisionTools
• R and R Studio Software
• Rockwell Arena 15.0
• SSH Secure Shell Client
• Matlab
• Solidworks 2017
• Wolfram Mathematica

associated with course work. The computer lab area can accommodate 45 students and also functions as a general PC lab outside of class hours.

The Industrial Engineering department is committed to providing the latest in computer technology, software capability, and technical expertise to enhance the educational experience for all students. The Foust Computation Lab is open 24 hours a day throughout the semester to all faculty, staff, and students enrolled in INEG classes.

Equipment
The lab features 45 stations capable of running virtual machines with Windows 10 Enterprise with 64 Bit Intel Xeon processors, 8.0GB of RAM, and solid state hard drives. The computers are all mapped to a pair of laser printers. Because the lab is virtual, students can access the lab computers from anywhere in the world. All they need is an Internet connection and the Citrix receiver.

Shared INEG/CVEG Computer Laboratory (Bell 4133)

This lab is shared with the Civil Engineering Department.

The lab features 24 stations capable of running virtual machines with Windows 10 Enterprise with 64 Bit Xeon processors, 8.0GB of RAM, and solid state hard drives. The computers are all mapped to a laser printer. Students can now access computers in this lab remotely from any Internet connection with the Citrix Receiver.

Stephens Undergraduate Research Lab (Bell 4134A)

The Larry and Gwen Stephens Undergraduate Research Lab provides state-of-the-art facilities including the latest computer hardware and software designed for industrial engineering projects.

The lab provides individual work space for undergraduate students. To be eligible for a space in this lab, a student must be engaged in research with an Industrial Engineering faculty member. In addition to a workspace, 24 students assigned to the lab are provided with a laptop computer.

Equipment
19 Dell Latitude wireless laptop computers with Windows 10 Enterprise, Intel Core i7 processors, 16.0GB of RAM, and solid state hard drives. The computers are all mapped to a HP Color LaserJet 4700 printer and a Xerox Phaser 4600 printer.

Foust Lab (Bell 4128)
The David D. and Nancy J. Foust Computation Laboratory is INEG’s premier computing and teaching lab providing general computing access for all Industrial Engineering students and supports the computing needs
The AT&T Manufacturing Automation Laboratory houses four work cells where...

- One work cell has integrated robotic arms (a six-axis articulating arm and a two-axis linear module) to form a unit where the robots are moved to the work object within a range of 1200mm to 1800mm. Both robots use the same controller and programming, but different power supplies. An electric-hydraulic scissor table can lift projects within the reach of the inverted six-axis articulating arm as the arm lowers itself to the project below.

- Two vision guide robot (VGR) work cells with four-axis SCARA are available with four cameras. One of the VGR work cells was a component of an Automated Temperature Measurement system where a touch screen panel computer for system control coordinated the SCARA, temperature data logger, and conveyer.

- One Baxter collaborative robot from Rethink Robotics. Baxter is intrinsically safe and possesses human-friendly task specification, allowing humans to work inside the work envelope and interact with the robot. With two seven-axis arms, integrated machine vision, and an interactive display, Baxter can handle complex perception and manipulation tasks and represents the next generation of industrial robotics.

The Manufacturing Automation Laboratory’s purpose is for students to gain hands-on exposure to the predominant machines for automated assembly, inspection, palletizing, and measurement through research activities and instructional projects.

The lab also includes a 3D Printer, several research robots for students to use and program, Programmable Logic Controllers, and workstations for Graduate Students who work in the lab.


The Bill and Margaret Harrison Family Video Conferencing Facility (4137)

The Bill and Margaret Harrison Family Video Conferencing Facility was made possible by a contribution from alumni William and Margaret Harrison of Little Rock.

The space features state-of-the-art software and equipment, LifeSize 220 Express, described as the most full-featured video conferencing system available.

The system allows remote video and audio communication between up to eight parties concurrently, and users can share content, control cameras, change layouts and add participants with ease. It includes an application for smart phones, tablets and computers and has the ability to record meetings and stream viewing.

Capstone Experience Lab (Bell 4138)

A dedicated space for students in the Industrial Engineering Capstone Experience course was developed during the fall 2013 term. It is equipped with a conference area, mobile media cart with a 60” television monitor and computer. This enables students to make presentations to industry partners.
Methods and Standards/Ergonomics Lab (4131)

This space hosts regular lab sections, which are an integral and required component of INEG 3714 Work Methods and Ergonomics. During lab sections, students complete experiments to reinforce concepts taught in lecture and gain hands-on experience with concepts such as cognitive ergonomics, hand tool design, anthropometric measurement, productivity improvement, line balancing, time studies, work sampling, and worksite analysis and design. Upon completion of these activities, students are required to prepare laboratory reports which help them to develop and improve their technical writing skills and ability to communicate technical concepts concisely.

ReliaSoft Alliance Laboratory (4129)

ReliaSoft Corporation donated software to the University of Arkansas to form and support the ReliaSoft Risk, Reliability, and Maintainability Research Alliance. The software provides engineering students with state of the art tools to help identify potential risks and calculate the severity of disruptions within a manufacturing or transportation environment.
Course Descriptions

INEG 2001. Industrial Engineering Seminar (Fa). 1 Hour. Overview of the Department of Industrial Engineering: faculty and their backgrounds and interests, staff and the services they provide, facilities, curricular requirements, extracurricular opportunities, post-graduate opportunities.

INEG 2103. Introduction to Industrial Engineering (Fa). 3 Hours. Introduction to the technical content of industrial engineering and the use of computing in the solution of traditional industrial engineering problems. Computer tools include spreadsheets, programming, and mathematical analysis software. Corequisite: Lab component.


INEG 2333. Applied Probability and Statistics for Engineers II (Sp, Fa). 3 Hours. Applications to engineering problems of two-population point and interval estimation, two-population hypothesis testing, linear regression, correlation, design of experiments, analysis of variance, and nonparametric statistics. Introduction to statistical quality control. Prerequisite: INEG 2313.

INEG 2403. Industrial Cost Analysis (Sp). 3 Hours. Use of accounting information for planning and control with emphasis on the engineering viewpoint; introduction to general accounting procedures; principles of cost accounting and other aspects of production costs; budgeting, depreciation, taxes, distribution of profits, securities, sources of corporate capital, interpretation of financial statements, and other related topics. Laboratory required. Corequisite: Lab component.

INEG 2413. Engineering Economic Analysis (Sp, Fa). 3 Hours. Economic aspects of engineering, including current economic problems and the treatment of estimates when evaluating alternative courses of action. Methods of selection and replacement of equipment and break-even points of operation; desirability of new processes or projects where asset life, rate of return on investment, and first, fixed, differential, marginal, and sunk costs must be considered. Corequisite: Drill component. Prerequisite: MATH 2564.

INEG 2812H. Honors Industrial Engineering Research Experience I (Sp). 2 Hours. Preparation of feasibility studies, including cost estimation, risk and uncertainty, sensitivity analysis, and decision making. Effects of taxes, depreciation and financing costs on cash flows. Prerequisite: INEG 2413.

APPENDIX

INEG 3623/INEG 3623H. Simulation (Fa). 3 Hours. Preparation of feasibility studies, including cost estimation, risk and uncertainty, sensitivity analysis, and decision making. Effects of taxes, depreciation and financing costs on cash flows. Prerequisite: INEG 2413.

INEG 4110/INEG 4101H. Special Topics in Industrial Engineering (Irregular). 1-3 Hour. Consideration of current industrial engineering topics not covered in other courses. Prerequisite: Senior standing. May be repeated for up to 3 hours of degree credit.

INEG 4243/INEG 4243H. Occupational Safety and Health Standards (Irregular). 3 Hours. Survey of existing and proposed standards by examining fundamental physical, economic, and legal bases. Performance vs. specific standards. Enforcement and data collection. National consensus and promulgation process. Includes a computer-based design project. Prerequisite: INEG 2313.

INEG 4253/INEG 4253H. Leadership Principles and Practices (Fa). 3 Hours. The course is designed to expose students to multiple approaches to leadership in a wide variety of settings. Leadership styles, the knowledge areas and competencies expected of today's leaders, the challenges leaders face, the historical and philosophical foundations of leadership, the relationships among leadership theory, leadership practice, and the moral-ethical aspects of leadership are among the topics covered in the course. A number of respected regional, national, and international leaders share "lessons learned" in their leadership journeys. Plus, a number of highly regarded leadership books and case studies on leadership are read and discussed. Students may not receive credit for INEG 4253 and INEG 5253/OMGT 5253. Prerequisite: Instructor consent.

INEG 3714. Work Methods and Ergonomics (Sp, Fa). 4 Hours. Ways of designing jobs, machines, operations and work environments so they are compatible with human capacities and limitations. Work methods topics include methods analysis, time studies, work sampling and learning curves. Cognitive and physical capabilities and limitations of humans are addressed through the study of human information processing, motor control theory, anthropometry, biomechanics, work physiology and manual material handling. Design of controls and displays, hand tools and workstations, along with work related musculoskeletal disorders. Pre/ Corequisite: INEG 2333.

INEG 3812H. Honors Industrial Engineering Research Experience II (Fa). 2 Hours. Development of an undergraduate research proposal. Introduction to the peer review process. Examination of conference travel, nationally-competitive award, and graduate fellowships. Emphasis on technical communication skills. Prerequisite: INEG 2812H and honors standing.

INEG 400VH. Honors Thesis (Sp, Su, Fa). 1-3 Hour. For Honors College students majoring in Industrial Engineering only. Prerequisite: Honors college students only and instructor consent.

INEG 4101/INEG 4101H. Special Topics in Industrial Engineering (Irregular). 1-3 Hour. Consideration of current industrial engineering topics not covered in other courses. Prerequisite: Senior standing. May be repeated for up to 3 hours of degree credit.

INEG 4223/INEG 4223H. Engineering Economic Analysis (Sp, Fa). 3 Hours. Economic aspects of engineering, including current economic problems and the treatment of estimates when evaluating alternative courses of action. Methods of selection and replacement of equipment and break-even points of operation; desirability of new processes or projects where asset life, rate of return on investment, and first, fixed, differential, marginal, and sunk costs must be considered. Corequisite: Drill component. Prerequisite: MATH 2564.

INEG 4253/INEG 4253H. Leadership Principles and Practices (Fa). 3 Hours. The course is designed to expose students to multiple approaches to leadership in a wide variety of settings. Leadership styles, the knowledge areas and competencies expected of today's leaders, the challenges leaders face, the historical and philosophical foundations of leadership, the relationships among leadership theory, leadership practice, and the moral-ethical aspects of leadership are among the topics covered in the course. A number of respected regional, national, and international leaders share "lessons learned" in their leadership journeys. Plus, a number of highly regarded leadership books and case studies on leadership are read and discussed. Students may not receive credit for INEG 4253 and INEG 5253/OMGT 5253. Prerequisite: Instructor consent.

INEG 4323. Quality Engineering and Management (Irregular). 3 Hours. Provides the student with complete coverage of the functional area of "Quality Assurance" ranging from the need for such a function, how it works, techniques utilized, and managerial approaches for insuring its effectiveness. Prerequisite: INEG 2333.

INEG 4343. Cognitive Ergonomics (Irregular). 3 Hours. Studies of human cognition in work settings in order to enhance performance of cognitive tasks through an understanding of cognitive processes (e.g., attention, perception errors, decision making, workload) required of operators in modern industries. Emphasis lies on how to (re)design human-machine interfaces and cognitive artifacts so that human well-being and system performance are optimized in work environments. Prerequisite: CSCE 2004.


INEG 4423/INEG 4423H. Advanced Engineering Economy (Irregular). 3 Hours. Preparation of feasibility studies, including cost estimation, risk and uncertainty, sensitivity analysis, and decision making. Effects of taxes, depreciation and financing costs on cash flows. Prerequisite: INEG 2413.
INEG 4433/INEG 4433H. Systems Engineering and Management (Fa). 3 Hours. Overview of the fundamental concepts underlying the management of engineering. Reviews the engineering decision process within the life cycle. Examines implementation of basic management functions in technical organizations and development of strategy tools within a complex organization. Prerequisite: INEG 2403.

INEG 4443/INEG 4443H. Project Management (Irregular). 3 Hours. Analysis of the strategic level of project management including planning, organizing, and staffing for successful project execution. Professional creativity, motivation, leadership, and ethics also are explored. At the tactical level, project selection, control, and systems management are analyzed. Systems development and decision support tools for project management are studied. Prerequisite: Senior standing.

INEG 4453. Productivity Improvement (Irregular). 3 Hours. Analysis of common productivity problems. Development of skills required to diagnose problems; measure productivity; develop improvement strategies; and provide for the implementation and maintenance of productivity measurement and improvement systems. Prerequisite: Senior standing.

INEG 4533. Application of Machine Vision (Sp). 3 Hours. Automated machine vision applied to assembly and inspection tasks traditionally performed by human operators; development of application by acquiring image, processing image data, analyzing image and transmitting results; application analysis, selection and economics. Laboratory required. Corequisite: Lab component. Prerequisite: Senior standing.

INEG 4543. Facility Logistics (Irregular). 3 Hours. The design and analysis of efficient logistics systems at the facility level, with an emphasis on distribution facilities. Unit load, break bulk, crossdock and order fulfillment centers and their component systems and software. Automated and manual systems. Corequisite: Lab component. Prerequisite: INEG 2413 and INEG 3613.

INEG 4553. Production Planning and Control (Fa). 3 Hours. Strategy and competition, forecasting, aggregate planning, inventory control subject to known demand, inventory control subject to uncertain demand, supply chain management, push and pull production control systems, and operations scheduling. Pre or Corequisite: INEG 3613. Prerequisite: INEG 2333.

INEG 4563. Industrial Robotics (Fa). 3 Hours. An interdisciplinary treatment of: industrial robotics; manipulator anatomy, control, and programming; end-of-arm tooling; sensors & sensing; system integration and safety; future trends. Significant out-of-class programming assignments to solve common industrial automation problems. Corequisite: Lab component. Prerequisite: Senior standing.

INEG 4583. Renewable Energy: Green Power Sources (Sp). 3 Hours. Current developments in renewable energy from a green power source where electricity, heating and fuel supply can be obtained other than typical energy sources. Technical and economical feasibilities and economic analyses of renewable energy considered for use in residential, small businesses, and industrial complexes. Prerequisite: Senior standing.

INEG 4593. Manufacturing Systems (Irregular). 3 Hours. This course is designed to highlight the major topics in manufacturing systems. Different manufacturing models and metrics are emphasized. This course also introduces classification, general terminology, technical aspects, economics, and analysis of manufacturing systems. Corequisite: Lab component. Prerequisite: INEG 3513 or graduate standing.

INEG 4633. Transportation Logistics (Irregular). 3 Hours. Quantitative aspects of transportation and logistics involving analysis and optimization. Topics include: facility location analysis, network design, network flow and transportation modeling, vehicle routing, fleet sizing, driver assignment, and supply chain issues (logistics demand, role of inventory in the network, role of technology, etc.). Prerequisite: INEG 2333 and INEG 3613.

INEG 4683. Decision Support in Industrial Engineering (Irregular). 3 Hours. Reinforcing important computer programming methods using industrial engineering-based applications. Students will utilize Microsoft Excel and Visual Basic for Applications to develop custom solutions to challenging industrial engineering problems. Emphasis on computational proficiency and computing productivity in a spreadsheet-based setting. Prerequisite: CSCE 2004 and INEG 2313.

INEG 4733. Industrial Ergonomics (Irregular). 3 Hours. Gives background and experience in measurement and evaluation of human performance as it pertains to the working environment. The physical, physiological and psychological capabilities of the tasks they are to perform. Laboratory projects required. Prerequisite: INEG 4723 and INEG 2333.

INEG 4812H Honors Industrial Engineering Research Experience III (Fall). 2 Hours. Completion of an undergraduate research thesis. Introduction to the identification of outlets for dissemination of industrial engineering research. Introduction to the process of identifying opportunities for future extensions of completed research. Prerequisite: INEG 3812H and honors standing.

INEG 4833. Introduction to Database Concepts for Industrial Engineers (Irregular). 3 Hours. An introduction to the basic principles of database modeling and technologies for industrial engineers. Coverage includes analyzing user requirements, representing data using conceptual modeling techniques (e.g. UML, ERD), converting conceptual models to relational implementations via database design methodologies, extracting data via structured query language processing, and understanding the role of database technology in industrial engineering application areas such as inventory systems, manufacturing control, etc. The application of a desktop database application such as Access will be emphasized. Prerequisite: CSCE 2004.

INEG 4911. Industrial Engineering Capstone Experience I (Fa). 1 Hour. Develop a written and oral proposal for a comprehensive project for an industrial sponsor. Conduct background research, data collection, and preliminary analysis using industrial engineering tools; define objectives, performance measures, and deliverables; identify and schedule required tasks. Pre- or Corequisite: INEG 2001, INEG 3613, INEG 3623, INEG 3714, INEG 4433, and INEG 4553.

INEG 4923. Industrial Engineering Capstone Experience II (Sp). 3 Hours. Develop a written and oral report for a comprehensive project for an industrial sponsor. Complete identified tasks and measure success in achieving defined objectives using industrial engineering tools; create and document deliverables. Students must have successfully completed INEG 4911 in the immediately prior semester. Prerequisite: INEG 3613, 3623, INEG 4911. Pre- or Corequisite: INEG 3513.
Industry Engineering Curriculum Flowchart

First Semester
- MATH 2554 Calculus I
- PHYS 2054 Univ. Physics I
- CHEM 11031 University Chemistry I
- GNEG 1111 Intro. to Engineering I
- ENGL 1013 Composition I

Second Semester
- MATH 2564 Calculus II
- Freshman Science Requirement2
- HIST 2003 or HIST 2013 or PLSC 2003
- GNEG 1121 Intro. to Engineering II
- ENGL 1023 Technical Composition II

Third Semester
- MATH 2574 Calculus III
- INEG 2313 Applied Probability and Statistics for Engineers I
- INEG 2413 Engineering Economic Analysis
- INEG 2001 Industrial Engineering Seminar
- INEG 2103 Intro to Industrial Engineering
- Science Requirement3

Fourth Semester
- MATH 2584 Differential Equations
- INEG 2333 Applied Probability and Statistics for Engineers II
- INEG 2403 Industrial Cost Analysis
- MEEG 2303 Introduction to Materials
- CSCE 2004 Programming Foundations I

Course is part of the Freshman Engineering Program and should be completed before student is admitted into the IE Program

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1CHEM 1113 Univ. Chemistry for Engineers I or CHEM 1213 Chemistry for Majors I are suitable substitutes
2CHEM 1123/1121L Univ. Chemistry II or PHYS 2074 University Physics II
3If the student selected CHEM 1123/1121L as their freshman science elective then this must be PHYS 2074 University Physics II; otherwise please see the approved list of IE science electives.
Bachelor of Science in Industrial Engineering Degree Check (Eff Fall 2018; 126 hours)

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INEG GPA

ENGR GPA

Degree GPA

"D" hours: 0
ABET Math & Sci: ___
Must be ≤ 8 hours
ABET Eng Sci & Des: ___

Remaining Courses to be Completed

INEG Dept Approval: 
Date: 

Dean's Office Approval: 
Date: 

Degree Check Form_Fall2018

27
Supply Chain Engineering Emphasis Area Request Form

Student Name: ____________________________________________

UA ID: ____________________________________________

Mailing Address: ____________________________________________

Mark only the completed courses that will be counted to fulfill the requirements of the Supply Chain Engineering Emphasis Area. Please note, you must complete 12 credit hours and earn a C or better in each of the courses to receive emphasis recognition. In addition to the 2 required courses marked below, you must complete 2 more courses from the following list. All of these courses may also count toward your technical elective requirements.

Please submit the completed form to your advisor in your last semester.

Mark Here

| X | INEG 4543 Facility Logistics or INEG 5543 Distribution Center Design & Operations* |
| X | INEG 4633 Transportation Logistics* |

**Must Complete Two Courses from the Following List:**

| INEG 4383 Risk Analysis for Transportation and Logistics Systems |
| INEG 4593 Manufacturing Systems |
| INEG 4683 Decision Support in Industrial Engineering |
| INEG 4833 Introduction to Database Concepts for Industrial Engineers |
| INEG 5313 Engineering Applications of Probability Theory |
| INEG 5323 Engineering Applications of Stochastic Processes |
| INEG 5613 Introduction to Optimization Theory |
| SCMT course on the approved list of technical electives |
| SCMT course on the approved list of technical electives |

* indicates required courses

_____________________________________________________________________________

Student’s Signature __________________________ Date __________________________

Advisor’s Approval __________________________ Date __________________________
University Core Requirements
The University of Arkansas has adopted a “State Minimum Core” of 35 semester-credit-hours of general education courses that are required of all baccalaureate degree candidates. This is in compliance with Arkansas Act 98 of 1989 and the subsequent action of the Arkansas State Board of Higher Education. Since 1991, all state institutions of higher education in Arkansas have had a 35-hour minimum core requirement with specified hours in each of seven academic areas in the table below. The university has identified those courses that meet the minimum requirement, and they are listed in the chart below.

Students should consult the requirements for specific colleges and programs when choosing courses for use in the University Core.

State Minimum Core

<table>
<thead>
<tr>
<th>Areas</th>
<th>Hours</th>
<th>University Core</th>
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<tbody>
<tr>
<td>English</td>
<td>6</td>
<td>ENGL 1013, ENGL 1014 (pending approval: effective spring 2018), ENGL 1023, ENGL 1033</td>
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<tr>
<td>Mathematics*</td>
<td>3</td>
<td>MATH 1203/MATH 1204, MATH 1313, or any higher-level mathematics course with MATH 1203 as a prerequisite or as required by major; to include STAT 2303</td>
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<td>Fine Arts</td>
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<td>ARCH 1003, ARHS 1003, COMM 1003, DANC 1003, ENGL 2023, HUMN 2114H, LARC 1003, MLIT 1003, MLIT 1013, MLIT 1333, THTR 1003, THTR 1013</td>
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<td>Humanities</td>
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<td>Any intermediate level foreign language***, AAST 2023, ARCH 1013, CLST 1003, CLST 1013, COMM 1233, ENGL 1213, GNST 2003, HUMN 1124H, HUMN 2124H, MRST 2013, MUSY 2003, PHIL 2003, PHIL 2103, PHIL 2203, PHIL 3103, WLIT 1113, WLIT 1123</td>
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<tr>
<td>Social Sciences (Select from at least two different fields of study)</td>
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<td>AGEC 1103, AGEC 2103, ANTH 1023, COMM 1023, ECON 2013, ECON 2023, ECON 2143, GEOS 1123, GEOS 2003, HESC 1403, HESC 2413, HESC 2603, HIST 1113, HIST 1123, HIST 2003****, HIST 2013****, HUMN 1114H, HUMN 2114H, PLSC 2003****, PLSC 2013, PLSC 2203, PSYC 2003, RESM 2853, SOCI 2013, SOCI 2033</td>
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</table>

* Some students majoring in math, engineering, science and business may be required to take a higher math as part of the State Minimum Core.
** Some students majoring in math, engineering, science, education and health-related professions may be required to take higher or specific science courses as part of the State Minimum Core.
*** Numbered at the 2000 level. See Department of World Languages, Literatures and Cultures in the J. William Fulbright College of Arts and Sciences chapter.
**** If not selected to meet the three hours of the U.S. History requirement.