### General Requirements

**First Semester**
- **ENGL 1113**, Prin. of English Composition (Core I)
- **CHMI 1335**, General Chemistry (Core I)
- **MATH 1823**, Calculus & Analytic Geometry I (Core I)
- **PS SC 1113**, American Federal Government (Core III)
- **ENGR 1411**, Freshman Engineering Experience

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<tr>
<th>Year</th>
<th>FIRST SEMESTER</th>
<th>Hours</th>
<th>SECOND SEMESTER</th>
<th>Hours</th>
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<tr>
<td>Freshman</td>
<td><strong>ENGL 1113</strong>, Prin. of English Composition (Core I)</td>
<td>3</td>
<td><strong>ENGL 1213</strong>, Prin. of English Composition (Core I), or</td>
<td>3</td>
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<td><strong>CHMI 1335</strong>, General Chemistry (Core I)</td>
<td>4</td>
<td><strong>EXPO 1213</strong>, Expository Writing (Core I)</td>
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<td><strong>MATH 1823</strong>, Calculus &amp; Analytic Geometry I (Core I)</td>
<td>3</td>
<td><strong>MATH 2423</strong>, Calculus &amp; Analytic Geometry II (Core I)</td>
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<td><strong>PS SC 1113</strong>, American Federal Government (Core III)</td>
<td>3</td>
<td><strong>HIST 1483</strong>, U.S., 1492-1865, or</td>
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<td><strong>ENGR 1411</strong>, Freshman Engineering Experience</td>
<td>1</td>
<td><strong>PHYS 2514</strong>, General Physics for Eng. &amp; Science Majors (Core II)</td>
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<td><strong>ELEC 1323</strong>, Fundamentals of Computer Programming, or</td>
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<td><strong>1313</strong>, Programming for Non-Majors</td>
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Total Credit Hours: 15

### Sophomore Year
- **MATH 2433**, Calculus & Analytic Geometry III
- **PHYS 2254**, General Physics for Engr. & Science Majors
- **CEES 2113**, Statics and Dynamics
- **ENGR 2002**, Professional Development
- **IE 2823**, Enterprise Engineering

**Junior Year**
- **MATH 2443**, Calculus & Analytic Geometry IV
- **IE 3304**, Design and Manufacturing II
- **IE 4113**, Spreadsheet-Based Decision Support Systems
- **IE 4553**, Engineering Experimental Design
- **IE 4623**, Systems Modeling and Optimization

**Senior Year**
- **BA D 5001**, Math/Computer Skills
- **AD 5102**, Managerial Economics
- **ACCT 5202**, Financial Accounting
- **FIN 5302**, Financial Markets and Securities
- **MG T 5702**, Organizational Behavior
- **MIS 5602**, Management Information Systems
- **SCM 5502**, Supply Chain Management
- **ENGR 2431**, Electrical Circuits
- **ENGR 2461**, Thermodynamics
- **ENGR 3441**, Fluid Mechanics

**Fifth Year**
- **IE 4333**, Production Systems and Operations
- **IE 4663**, Systems Analysis Using Simulation
- **BA D 5902**, Strategic Management
- **LS 5802**, Business Ethics
- **MG T 5712**, Negotiations and Leadership

### General Catalog for additional enrollment limitations.

- **Students must take the GMAT and apply for the MBA program during the third year; minimum OU GPA and combined GPA of 3.0 is required.**
- **Students must also apply to the Price College of Business during the spring semester of the junior year to be admitted by that college to the MBA program.**
Accelerated Industrial Engineering/Master of Business Administration—A528/F140 Q340 — Page 2

COURSES IN CHEMISTRY AND BIOCHEMISTRY (CHEM)
1315 General Chemistry. Prerequisite: Mathematics 1303 or 1643, or math ACT equal to or greater than 23. A two-semester sequence in general chemistry. Topics covered: basic measurement, gas laws and changes in state, stoichiometry, atomic theory, electron configuration, periodicity, bonding, molecular structure and thermochromy. Laboratory (F, Sp, Su) [II-LAB]

COURSES IN CIVIL ENGINEERING AND ENVIRONMENTAL SCIENCE (CEES)
2113 Statics and Dynamics (Crosslisted with Petroleum Engineering 2113). Prerequisites: Physics 2514 and Mathematics 2433 or concurrent enrollment in Mathematics 2443. Vector representations of forces and moments; general and kinematical interpretations of statics and dynamics; centroids and moments of area and inertia. Free-body diagrams, equation of a particle and of rigid bodies, principles of work and energy; principle of impulse-momentum. Motion of particles and rigid bodies in translating and rotating reference frames. Newton’s law of motion and Lagrange’s equation, including application to lumped-parameter systems. Analyses of trusses, frames and machines. (F, Sp)

2153 Mechanics of Materials. Prerequisites: 2113 or Aerospace and Mechanical Engineering 2113 or Petroleum Engineering 2113. Basic principles of mechanics, including the definition of stress and strain; strain-energy and force-displacement relations; stress-strain diagrams for various materials; stress analysis for beams, columns and trusses. Solutions to problems by the methods of superposition and the principle of superposition. Analysis of elementary one- and two-dimensional mechanics problems, including thermal stresses and strains, beam flexure, shear and deflections, pressure vessels and buckling of columns. (Sp)

COURSES IN COMPUTER SCIENCE (C S)
1313 Programming for Nonmajors. Prerequisite: Mathematics 1523 or concurrent enrollment. Introduction to the design and implementation of computer programs. Emphasis on understanding of program structure via the study of small sample programs. Laboratory (F, Sp)

1323 Introduction to Computer Programming. Prerequisite: MATH 1523 or placement into MATH 1741 or above, or MATH 1823 as a corequisite. Introduction to the design and implementation of computer programs with an emphasis on abstraction and program organization. (F, Sp)

COURSES IN ENGINEERING (ENGR)
1411 Freshman Engineering Experience. Prerequisite: declared major in Engineering or permission of instructor. Introduction to the culture of all engineering disciplines, human performance efficiency, history, ethics, and societal responsibilities. Lecture hours cover a variety of topics including: majors and minors; career planning; advising; and extra-curricular activities. Students also work on multi-disciplinary engineering projects in smaller groups during the lab hour. (F)

2002 Professional Development. Prerequisite: sophomore standing. Develop an understanding of the engineering profession, the place of engineers in society, and professional responsibility through the concepts of contemporary, social, and global issues. (F, Sp)

2431 Electrical Circuits. Prerequisites: Mathematics 2423 and Physics 2524 or concurrent enrollment. Introduction to basic principles of electrical circuits. Topics include circuits (DC circuits, AC circuits, electric transmission lines, transformers); static electrified engineering major. Lecture hours cover a variety of topics including: majors and minors; career planning; advising; and extra-curricular activities. Students also work on multi-disciplinary engineering projects in smaller groups during the lab hour. (F)

2461 Thermodynamics. Prerequisites: Mathematics 2433 and Physics 2524 or concurrent enrollment. Introduction to basic principles of thermodynamics. Topics include density, pressure, and temperature, the first law of thermodynamics for a system, the first law of thermodynamics for a control volume, the second law of thermodynamics, and psychrometrics. (F)

441 Fluid Mechanics. Prerequisite: Mathematics 2433. Introduction to basic principles of fluid mechanics. Topics include fluid properties, fluid statics, dimensionless parameters and similarity, control volume, open channel flows, and external flow. (F)

COURSES IN INDUSTRIAL ENGINEERING (I E)
2303 Materials, Design and Manufacturing Processes (Crosslisted with Aerospace and Mechanical Engineering 2303). Prerequisites: Aerospace and Mechanical Engineering 2113 or Civil Engineering and Environmental Science 2113 or Engineering 2113. Mechanical and physical properties of engineering materials. Introduction to design concepts, manufacturing processes and equipment used in engineering. (Sp)

2311 Computer Aided Design and Graphics Laboratory for Industrial Engineers. Corequisite: 2303. Provides students with a basic understanding of technical graphic communication and computer-aided design for industrial engineering applications. By using computer-aided design/graphics software, SolidWorks/AutoCAD, students will learn basic principles of engineering graphics and geometric modeling to assist in design problem visualization and planning. (Sp)

2823 Enterprise Engineering. Prerequisite: sophomore standing. Introduction to the industrial engineering role as enterprise system integrator. Systems concepts, modeling and analysis; integrated project/service and operational process design; productivity and quality improvement; computer technology insertion; project, operations, and global supply chain management. (F)

G2939 Applied Engineering Statistics. Prerequisite: Mathematics 2433. Introduction to probability, conditional probability and discrete and continuous random variables, functions of random variables, expectation, discrete and continuous distributions, sampling and descriptive statistics, parameter estimation, use of statistical packages. Not available for graduate credit for students in engineering disciplines. (F, Sp, Su)

G2304 Design and Manufacturing II. Prerequisites: 2303, 2311, Civil Engineering and Environmental Science 2153 (or concurrent enrollment) or Aerospace and Mechanical Engineering 3143 (or concurrent enrollment). Dimensioning and tolerancing; tolerances—type, design and specification; assembly and fit design; tolerance standards; process planning—precedence representation in machining, operation and machine sequencing; inspection of manufacturing processes, time and cost estimation for manufacturing; automation; processes/system integration. Laboratory (F)

4113 Spreadsheet-Based Decision Support Systems. Prerequisite: IE 4623 or concurrent enrollment in E I 4623, Computer Science 1313 or C S 1323, or permission of instructor. Covers all aspects of the spreadsheet environment, principles of decision-support systems studied in a variety of applications, including facility layout, warehousing, portfolio optimization, and various statistical inference problems. (F)

G4223 Fundamentals of Engineering Economy. Prerequisite: Mathematics 2423. Introduction to fundamental economic concepts and principles utilizing multivariate, multistaged mathematical models. Topics include cost and worth comparison, capital costs and sources, time value of money, replacement economics, taxes, economic efficiency of alternate designs, minimum cost and maximum benefits, risk and uncertainty and economics of work schedules. (Sp)

G4333 Production Systems and Operations. Prerequisite: 2823 and 4623, or by permission. Simplex modeling oriented to production environments, principles of decision-support systems. Simplex methods, sensitivity analysis. Practical applications using optimization software such as LINDO, LINGO, Excel SOLVER. Analytical decision making. Introduction to stochastic programming. (F)

4633 Applied Engineering Optimization. Prerequisite: Engineering 3293 or 3293, 4623. Data mining techniques, heuristics and applications of operations research to financial engineering, site location, transportation, assignment and matching problems. Routing facilities, facility layout models, queueing models and applications, Monte Carlo simulations and applications. (Sp)

4663 Systems Analysis Using Simulation. Prerequisite: Engineering 3293 or 3293, 4633. Implements the science of systems analysis through the use of simulation modeling and statistical analysis, inclusive of time study analysis for performing input modeling labora (F)

4804 Ergonomics in Systems Design. Prerequisite: junior standing or permission of instructor. The measurement of human physical capabilities and limitations. Measurement of the environment and elicited human responses. Workplace, equipment and job design with regard to human performance efficiency, health, and safety. Laboratory (F)

G5853 Applied Research Methods (Slashlisted with 4853). Prerequisite: 4553 and 4804. Experimental methodology for empirical investigation, including problem formulation. The development and measurement of performance criteria, experimental and oral communication. The measurement of human performance is typically the vehicle used for students in this course. No student may earn credit for both 4853 and 5853. (F)

G5363 Facility Planning, Warehousing, and Material Handling (Slashlisted with 4363). Prerequisite: 4623. Facility location and layout models, design, analysis, and improvement of warehousing operations, material handling systems in manufacturing and warehousing operations, inventory technologies for management of operations, supply chain relationships. Focus will be on statistical process control tools and total quality management. No student may earn credit for both 4563 and 5363. (Sp)

COURSES IN MATHEMATICS (MATH)
1823 Calculus and Analytic Geometry I. Prerequisite: 1523 at OU, or satisfactory score on the placement test, or, for incoming freshmen direct from high school, satisfactory score on the ACT/SAT. Topics covered include equations of straight lines; conic sections; functions, limits and continuity; differentiation; maximum—minimum theory and curve sketching. A student may not receive credit for this course and 1213, 2823, or 2823 and 2823. (F)

2423 Calculus and Analytic Geometry II. Prerequisite: 1823. Integration and its applications; the calculus of transcendental functions; techniques of integration; and the introduction to differential equations. A student may not receive credit for this course and 2123. (F, Sp, Su)[I-M]

2433 Calculus and Analytic Geometry III. Prerequisite: 2423. Polar coordinates, parametric equations, sequences, series, Taylor’s series, vector functions, and vector analysis. (F, Sp, Su)

2443 Calculus and Analytic Geometry IV. Prerequisite: 2433. Vector calculus; functions of several variables; partial derivatives; gradients, extreme values and differentials of multivariate functions; multiple integrals; line and surface integrals. (F, Sp, Su)

COURSES IN PHYSICS (PHYS)
2514 General Physics for Engineering and Science Majors. Prerequisite: Mathematics 1823 or Mathematics 1914 with grade of C or better. Not open to students with credit in 2105. Vectors, vector addition, trigonometry, and dynamical articles, wave mechanics. Optional technical kinematics and dynamics, oscillations, gravitation, fluid mechanics, waves. (F, Sp, Su)[II-NL]

2524 General Physics for Engineering and Science Majors. Prerequisite: 2514 and Mathematics 2423. Not open to students with credit in 1215. Temperature, heat, thermodynamics, electricity, magnetism, optics. (F, Sp, Su)

Course descriptions for the graduate business courses and electives may be found online at http://catalog.ou.edu/courses/courses.htm.