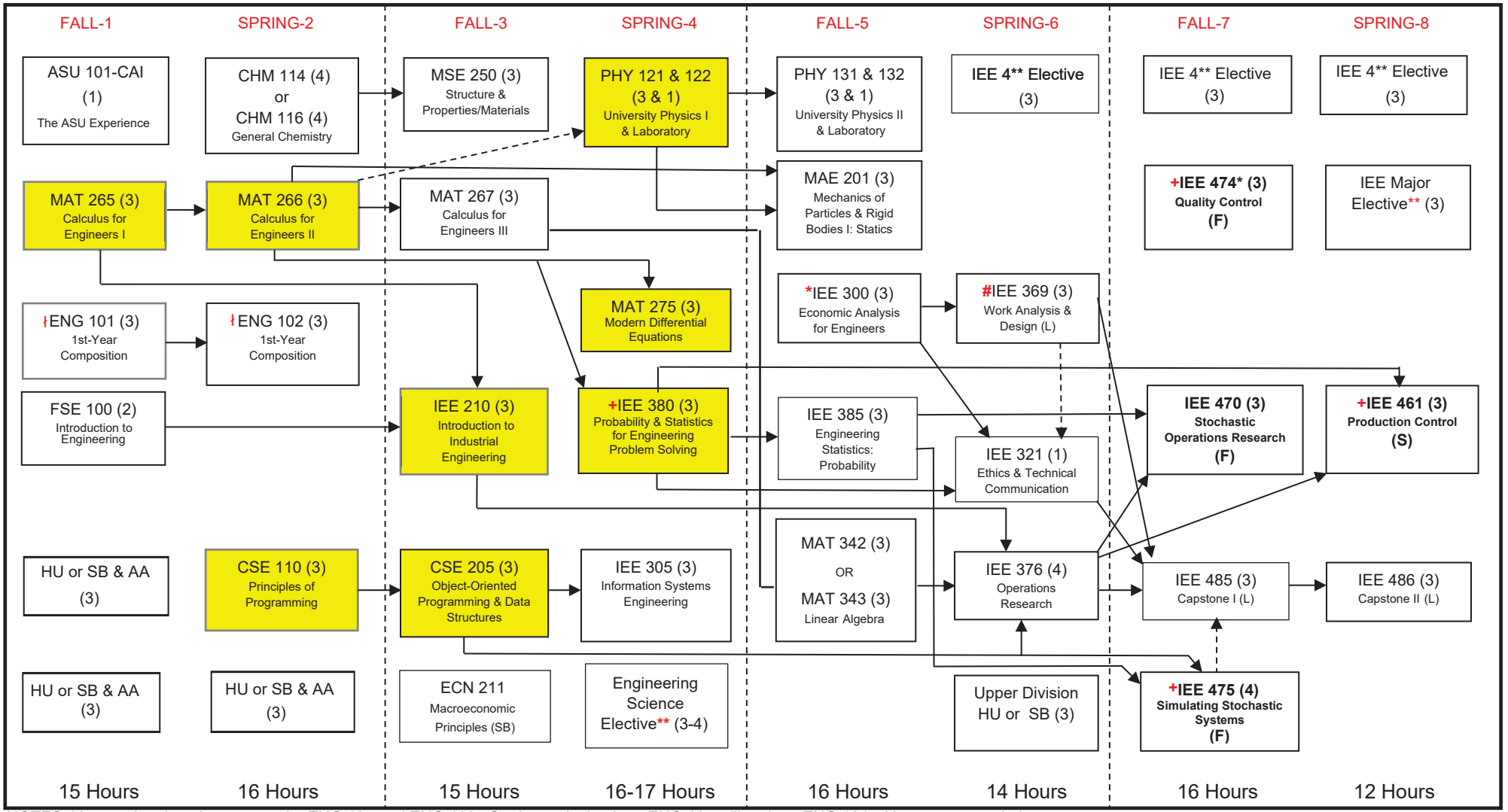
**School of Computing & Augmented Intelligence**
**Industrial Engineering, BSE** (ESIEEBSE)
**Updated: 2023-2024 Catalog Year Requirements**

Name: _____
Student ID#: _____




NOTES: ǂ International students may take ENG 107 and ENG 108. Students placing in to ENG 105 will replace ENG 101 with a recommended course

** See SCAI Advising Center or SCAI Website (https://scai.engineering.asu.edu/industrial-engineering-bse/industrial-engineering-degree-requirements/) for degree requirements, i.e. technical electives.

\+ All upper division IEE courses (Career Focus Area and Tech Elective) require additional prerequisites. Please check the catalog for specific information.

\# All prerequisite coursework must be completed prior to taking IEE 485 (IEE 321; IEE 369; IEE 376; IEE 475; ENG 101, 105, or 107)

Shaded courses designate "Critical Requirements" and must be completed as described above to remain on-track. Twice off-track students will be required to change their major. Minimum "C" grade is required in all major courses (see major map for details)

All ASU students must complete required general studies including 2 lower division HU, 2 lower division SB, one upper division HU or SB, and 1 class from each of the 3 Awareness Areas (AA)

Prerequisite →

☐ Cultural ☐ Global ☐ Historical

**Term 1**

**MAT 265: Calculus for Engineers I** - Limits and continuity, differential calculus of functions of one variable, introduction to integration. Not open to students with credit in MAT 270.

**ENG 101: First-Year Composition**

**FSE 100: Introduction to Engineering** - Introduces the engineering design process; working in engineering teams; the profession of engineering; engineering models, written and oral technical communication skills.

**ASU 101-IEE: The ASU Experience**

**HU/SB & Awareness Area**: Humanities, Fine Arts & Design or Social & Behavioral Sciences

**HU/SB & Awareness Area:** Humanities, Fine Arts & Design or Social & Behavioral Sciences

**Term 2**

**CHM 114: General Chemistry for Engineers or CHM 116: General Chemistry II (pre-req is CHM 113). MUST TAKE CHM116 if CHM 113 is taken for Basic Science Elective.**

**MAT 266: Calculus for Engineers II** - Methods of integration, applications of calculus, elements of analytic geometry, improper integrals, Taylor series.

**ENG 102: First-Year Composition**

**CSE 110: Principles of Programming** - Concepts of problem solving using Java, algorithm design, structured programming, fundamental algorithms and techniques, and computer systems concepts. Social and ethical responsibility.

**HU/SB & Awareness Area**: Humanities, Fine Arts & Design or Social & Behavioral Sciences

**Term 3**

**MSE 250: Structure and Properties-Materials** - Basic concepts of material structure and its relation to properties. Application to engineering problems.

**MAT 267: Calculus for Engineers III** - Vector-valued functions of several variables, partial derivatives, and multiple integration.

**IEE 210: Introduction to Industrial Engineering** - History of IE: IE career paths; ethical, social, and contemporary issues; introduces IE techniques, methods, and their application; case studies.

**CSE 205: Object-Oriented Programming & Data Structures** - Problem solving by programming with an object-oriented programming language. Introduces data structures. Overview of computer science topics.

**ECN 211:** Macroeconomic Principles - Basic macroeconomic analysis. Economic institutions and factors determining income levels, price levels, and employment levels.

**Term 4**

**PHY 121/122: University Physics I: Mechanics and laboratory** - Kinematics; Newton's laws; work, energy, momentum, conservation laws; dynamics of particles, solids, and fluids. Both PHY 121 and PHY 122 must be taken to secure SQ General Studies credit.

**MAT 275: Modern Differential Equations** - Introduces differential equations, theoretical and practical solution techniques. Applications. Problem solving using MATLAB.

**IEE 380: Probability and Statistics for Engineering Problem Solving** - Applications-oriented course with computer-based experience using statistical software for formulating and solving engineering problems.

**IEE 305: Information Systems Engineering** - Overview of computer and information systems applications. Topics include client/server; distributed computing; networks; process modeling; e-commerce; enterprise applications; Internet.

**Engineering Science Elective (see Major Map for course options)**

**Term 5**

**PHY 131/132: University Physics II: Electricity and Magnetism and laboratory** - Electric charge and current, electric and magnetic fields in vacuum and in materials, and induction. AC circuits, displacement current, and electromagnetic waves. Both PHY 131 and PHY 132 must be taken to secure SQ General Studies credit.

**MAE 201: Mechanics of Particles and Rigid Bodies I: Statics** - Force vectors and force system resultants, equilibrium of particles and rigid bodies, friction, centroid and moments of inertia of an area. Required for aerospace engineering and mechanical engineering.

**IEE 300: Economic Analysis for Engineers** - Economic evaluation of alternatives for engineering decisions, emphasizing the time value of money.

**IEE 385: Engineering Statistics: Probability** - Conditional probability, common probability models, Goodness-of-fit tests and reliability models.

**MAT 342 or MAT 343: Linear Algebra** - Solving linear systems, matrices, determinants, vector spaces, bases, linear transformations, eigenvectors, norms, inner products, decompositions, applications. Problem solving using MATLAB.

**Term 6**

**IEE 400-Level Elective**

**IEE 369: Work Analysis and Design (L)** - Planning, analysis, and design of methods of accomplishing work. Emphasizes human factors, work planning, methods analysis and design, and work measurement. Applications in diverse fields.

**IEE 321: Ethics and Technical Communication** - Methods and tools for preparing students for work in industry including ethics, technical writing and communications; understanding how learned undergraduate skills are used in the workplace and in engineering problem solving.

**IEE 376: Operations Research Deterministic Techniques/Applications** - Industrial systems applications with deterministic operations research techniques. Resource allocation, product mix, production, transportation, task assignment, networks.

**Upper Division HU/SB:** Upper division Humanities or Social and Behavioral Science

**Term 7**

**IEE 400-Level Elective**

**IEE 474**: **Quality Control** - Basic statistical process control techniques, capability analysis, design of experiments, and acceptance sampling plans.

**IEE 470**: **Stochastic Operations Research** - Modeling and analysis with emphasis on stochastic operations research. Models for stochastic processes, including Markov chains, queuing and decision analysis.

**IEE 485: Systems Design Capstone I** - Senior capstone project provides students with the skills required to effectively complete a capstone project in design and development.

**IEE 475: Simulating Stochastic Systems** - Analyzes stochastic systems using basic queuing networks and discrete event simulation. Basic network modeling, shared resources, routing, assembly logic.

**Term 8**

**IEE 400-Level Elective**

**IEE Major Elective**

**IEE 461: Production Control** - Techniques for the planning, control, and evaluation of production systems. Forecasting, inventory control, scheduling, enterprise requirements planning, supply chain design, and coordination.

**IEE 486: Systems Design Capstone II** - Project in design and development. Individual or team capstone project in creative design and synthesis.