# Required Concentrations for Industrial Management Majors only

*(Effective Fall 2013 and available only to students following the BSIM plan of study new in Fall 2013)*

<table>
<thead>
<tr>
<th>Management Information Systems (15 credits)</th>
<th>Manufacturing and Service Operations Management (15 credits)</th>
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<tbody>
<tr>
<td><strong>Successfully complete the following courses</strong></td>
<td><strong>Complete the following courses:</strong></td>
</tr>
<tr>
<td>MGMT 29000  Programming for Business Applications</td>
<td>MGMT 45200  Manufacturing Strategy</td>
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<tr>
<td>MGMT 54500  Systems Development</td>
<td><strong>Complete one of the following courses for 3 credits:</strong></td>
</tr>
<tr>
<td>MGMT 54700  Computer Communications Systems</td>
<td>MGMT 40500  Six Sigma and Quality Management</td>
</tr>
<tr>
<td><strong>Successfully complete 1 of the following courses</strong></td>
<td>OBHR 47000  MGMT of Adv. Manufacturing Organizations</td>
</tr>
<tr>
<td>MGMT 48800  Electronic Commerce &amp; Information Strategies</td>
<td><strong>Complete two of the following courses for 6 credits:</strong></td>
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<tr>
<td>MGMT 59000  Adv. Data Management for Decision Making</td>
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<tr>
<th>Operations &amp; Supply Chain Management (15 credits)*</th>
<th>Quantitative Methods (15 credits)</th>
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<tr>
<td><strong>Complete the following courses for 6 credits:</strong></td>
<td><strong>Complete the following course:</strong></td>
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<tr>
<td>MGMT 49000  Logistics</td>
<td>MA 26200  Linear Algebra &amp; Differential Equations</td>
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<tr>
<td>MGMT 49000  Supply Chain Analytics</td>
<td>IE 33600  Operations Research - Stochastic Models</td>
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<tr>
<td><strong>Complete the following courses for 9 credits:</strong></td>
<td>IE 53600  Stochastic Models in Operations Research I</td>
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<tr>
<td>MGMT 45200  Manufacturing Strategy</td>
<td>IE 53700  Discrete Optimization Models &amp; Algorithms</td>
</tr>
<tr>
<td>MGMT 40500  Six Sigma and Quality Management</td>
<td>STAT 51200  Applied Regression Analysis</td>
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<td>MGMT 49000  Project Management</td>
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<tr>
<th>Economics Honors (15 credits)</th>
<th>Analytical Consulting (15 credits)</th>
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<tbody>
<tr>
<td><strong>Students must have a 3.3 in all ECON courses and an overall GPA of 3.3 to pursue ECON Honors.</strong></td>
<td><strong>Successfully complete 3 of the following courses</strong></td>
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<tr>
<td><strong>Complete the following courses:</strong></td>
<td>MGMT 40500  Six Sigma and Quality Management</td>
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<tr>
<td>ECON 34000  Intermediate Microeconomics Theory</td>
<td>MGMT 49000  Advanced Spreadsheet Modeling and Simulation</td>
</tr>
<tr>
<td>ECON 35200  Intermediate Macroeconomics</td>
<td>MGMT 49000  Business Data Mining</td>
</tr>
<tr>
<td>ECON 36000  Econometrics</td>
<td>MGMT 49000  Predictive Analytics</td>
</tr>
<tr>
<td>ECON 49900  Senior Honors Thesis (Spring only)</td>
<td>MGMT 54400  Database Management Systems</td>
</tr>
<tr>
<td>One ECON 30000 or 40000 level course</td>
<td>ECON 36000  Econometrics</td>
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<th>Economics (15 credits)</th>
<th><strong>Successfully complete 2 of the following courses</strong></th>
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<td><strong>Complete the following courses:</strong></td>
<td>MGMT 42500  Marketing Research</td>
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<tr>
<td>ECON 34000  Intermediate Microeconomics Theory</td>
<td>MGMT 49000  Marketing Analytics</td>
</tr>
<tr>
<td>ECON 35200  Intermediate Macroeconomics</td>
<td>MGMT 49000  Supply Chain Analytics</td>
</tr>
<tr>
<td>Three additional ECON 30000 or 40000 level courses</td>
<td>MGMT 41100  Investment Management</td>
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<td>MGMT 46200  Advanced Manufacturing Planning &amp; Control</td>
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<td>MGMT 50600  Auditing</td>
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<td>ECON 45100  Game Theory</td>
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**Notes:**
1. All MGMT, ECON and OBHR 300-level or higher courses require upper division status.
2. Fifteen credits are required to complete an Industrial Management concentration.
3. Only one course may be shared between two concentrations.
4. Space in MGMT, ECON and OBHR courses may be limited.
5. Concentration courses must be taken at the Purdue West Lafayette campus for a grade.
6. Pre-requisites should be checked on MyPurdue.
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**Science – Biology (16-21 credits)**

**Complete 1 of the following sequences (7-8 credits):**

**Sequence 1:**
- BIOL 11000 Fundamentals of Biology I (4cr)
- BIOL 11100 Fundamentals of Biology II (4cr)

**Sequence 2:**
- BIOL 12100 BIOL I: Diversity, Ecology, & Behavior (2cr)
- BIOL 13100 BIOL II: Develop/Structure/Function of Organisms (3cr)
- BIOL 13500 First Year Biology Lab (2cr)

**Complete the following courses:**
- BIOL 23100 BIOL III: Cell Structure & Function (3cr)
  or
- BIOL 23000 Biology of the Living Cell (3cr)
  or
- BIOL 24100 BIOL IV: Genetics & Molecular Biology (3cr)
  or
- AGRY 32000 Genetics (3cr)

**Complete 1 of the following courses: (2-4 credits)**
- BIOL 28600 BIOL 42000 BIOL 48100 BIOL 55900
- BIOL 29500 BIOL 43200 BIOL 48300 BIOL 57300
- BIOL 30100 BIOL 43600 BIOL 49300 BIOL 58000
- BIOL 30200 BIOL 43800 BIOL 51100 BIOL 59200
- BIOL 32800 BIOL 43900 BIOL 51600 BIOL 58705
- BIOL 36600 BIOL 44400 BIOL 51700 BIOL 59500
- BIOL 39500 BIOL 44600 BIOL 53700 BIOL 59700
- BIOL 41500 BIOL 47800 BIOL 53800 BIOL 59900
- BIOL 41600

**Complete at least 1 of the following lab courses:**
- BIOL 23200 Lab in Cell Structure & Function
- BIOL 24200 Lab in Genetics & Molecular BIOL
- BIOL 30100 Human Anatomy & Physiology
- BIOL 30200 Human Anatomy & Physiology
- BIOL 32800 Principles of Physiology
- BIOL 36600 Developmental Biology
- BIOL 39500 Macromolecules
- AGRY 32100 Genetics Lab

**Science – Earth, Atmospheric & Planetary Sciences (17 credits)**

**Complete the following courses (7 credit hours):**
- EAPS 11100 Physical Geology
- EAPS 22100 Intro to Atmospheric Science
  or
- EAPS 22500 Science of the Atmosphere
- EAPS 23000 Laboratory in Atmospheric Sciences

**Complete 10 additional credit hours in EAPS:**
- Only one of the additional courses may be at the 10000 level.
- All courses for this concentration must be taken at Purdue

**Science – Chemistry (16 credits)**

**Complete 16 hours beyond CHM 11500 and CHM 11600 in additional general chemistry courses.**

CHEM 22400, CHEM 25700, and CHEM 33300 cannot be used to fulfill this requirement; 3 credits of CHEM 49900 may be used to fulfill this requirement.

**Science – Math (15 credits)**

**Complete 1 of the following courses:**
- MA 26500 Linear Algebra
- MA 35100 Elementary Linear Algebra
- MA 51100 Linear Algebra with Applications

**Complete 1 of the following courses:**
- MA 34100 Foundations of Analysis
- MA 44000 Real Analysis Honors
- MA 45000 Algebra Honors
- MA 45300 Elements of Algebra

**Complete 9 more credits from the following courses:**

**Analysis area:**
- MA 30100 Introduction to Proof through Real Analysis
- MA 34100 Foundations of Analysis
- MA 44000 Real Analysis – Honors
- MA 36200 Topics in Vector Calculus
  or
- MA 51000 Vector Calculus

**Algebra & Discrete Mathematics area:**
- MA 37500 Introduction to Discrete Mathematics
- MA 38500 Introduction to Logic
- MA 45300 Elements of Algebra
  or
- MA 45000 Algebra Honors
- MA 45400 Galois Theory – Honors

**Linear Algebra area:**
- MA 35300 Linear Algebra II

**Differential Equations area:**
- MA 36600 Ordinary Differential Equations
  or
- MA 30300 Differential Equations for ENGR and Science
  or
- MA 30400 Differential Equations & Analysis of Nonlinear Systems for ENGR and Science
- MA 42800 Introduction to Fourier Analysis
- MA 52000 Boundary Value Problems of Differential Equations
- MA 52300 Introduction to Partial Differential Equations

**Science – Physics (15 credits)**

**Complete 1 option from each of the following course sequences:**

**Sequence 1:**
- PHYS 15200 Mechanics (4cr)
  and PHYS 24200 Introduction to Heat & Thermal Physics (1cr)
  or
- PHYS 17200 Modern Mechanics (4cr)

**Sequence 2:**
- PHYS 24100 Electricity and Optics (4cr)
  and PHYS 25200 Electricity and Magnetism Laboratory (1cr)
  or
- PHYS 27200 Electric and Magnetic Interactions (4cr)

**Complete 1 of the following courses:**
- PHYS 34200 Modern Physics (3cr)
  or
- Modern Physics – Honors (4cr)
- PHYS 34400
- PHYS 34000 Modern Physics Lab (1cr)

**Complete 6 additional credit hours at or above the 300 level in Physics.**

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**Effective Fall 2013**

Not available to students outside of the School of Management

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Science – Statistics (15 credits)
Complete the following courses:
STAT 51200  Applied Regression Analysis
STAT 51300  Statistical Quality Control
STAT 51400  Design of Experiments
Complete 6 additional credit hours in Statistics - STAT 22500 or MGMT 30500 may not fulfill this minor.

Science, Technology, Engineering and Math (STEM)*
Complete 15 credits of the following courses, CODO in only:
AAE 20300  Aeromechanics (3cr)
AAE 25100  Intro to Aerospace Design (3cr)
BME 20100  Biomolecules: Structure, Function & ENGR Appl. (3cr)
CE 20300  Principles 7 Practices of Geomatics (4cr)
CE 29700  Basic Mechanics I: Statics (3cr)
CEM 20100  Life Cycles Engineering & Management (3cr)
CS 15900  Programming Applications for Engineering (3cr)
ECE 20100  Linear Circuit Analysis I (3cr)
ENGR 13100  Transforming Ideas to Innovation I (2cr)
ENGR 13200  Transforming Ideas to Innovation II (2cr)
IE 23000  Probability & Statistics in Engineering (3cr)
IE 34300  Engineering Economics (3cr)
MA 26500  Linear Algebra (3cr)
ME 20000  Thermodynamics (3cr)
ME 27000  Basic Mechanics I (3cr)
MSE 23000  Structure & Properties of Materials (3cr)
MSE 23500  Materials Properties Laboratory (3cr)
NUCL 20000  Introduction to Nuclear Engineering (3cr)
PHYS 24100  Electricity & Optics (3cr)

Computer Science (21 credits)
Complete the following courses with a "C" or higher. All courses require permission from the CS department to enroll: www.cs.purdue.edu/courses/courses.html
Pre-requisite course:
CS 17700(4cr)  Programming with Multimedia Objects
Complete the following courses:
CS 18000(4cr)  Problem Solving and Object-Oriented Programming
CS 18200(3cr)  Foundations of Computer Science
CS 24000(3cr)  Programming in C
CS 25000(4cr)  Computer Architecture
CS 25100(3cr)  Data Structure and Algorithms

Engineering–Industrial Engineering (complete 15 credits)
Complete the following courses:
Work Methods and Design
IE 38600  Work Analysis and Design I
IE 55600  Job Design
IE 55800  Safety Engineering
IE 57700  Human Factors in Engineering
Statistical Control
IE 53000  Quality Control
IE 53300  Industrial Applications of Statistics
Economic Decision Making
IE 54500  Engineering Economic Analysis
IE 54600  Economic Decisions in Engineering
IE 59000  Topics in Industrial Engineering

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**Financial Engineering (15 credits)**

Must have completed MGMT 31000 or IE 34300

*Successfully complete five (5) of the following courses:*

- MGMT 41100 Investment Management
- MGMT 41200 Financial Markets and Institutions
- MGMT 41500 International Finance
- MGMT 49000 Advance Spreadsheet Modeling
- MGMT 49000 Predictive Analytics
- MGMT 49000 Futures and Options
- ECON 51100 Macroeconomic Theory
- ECON 56200 Econometrics
  - IE 53500 Linear Programming (pre-requisite IE 33500 and CS 15900 (15600) or CS 18000)
  - IE 53800 Nonlinear Optimization Algorithms and Models (pre-requisite IE 33500 and CS 15900 (15600))
  - IE 54600 Economic Decisions in Engineering (pre-requisite IE 33600)
  - IE 58100 Simulation Design and Analysis (pre-requisite CS 15900, IE 33000, IE 33600)
  - IE 59000 Financial Engineering (Summer Only)

MGMT students who have completed a programming course (CS 15900 or CS 18000) and MGMT 30500 and MGMT 30600 may enroll in these IE classes. Inquire about the necessary overrides at pbrunese@purdue.edu