

**OPERATIONS RESEARCH MODELS FOR MANUFACTURING SYSTEMS  
IE412, FALL 2016**

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**COURSE INFORMATION**

**Course Meeting Times:** TR 12:30 – 1:50PM  
**Classroom:** 153 Mechanical Engineering Building  
**Credit Hours:** 3 hours (4 hour option for graduate students)  
**Course Website:** Located at <https://compass2g.illinois.edu> (access restricted to enrolled students)

**Instructor:** Douglas M. King, Ph.D. (dmking@illinois.edu)  
**Office Location:** 3 Transportation Building  
**Office Hour\*:** Wednesday, 2:00-2:50PM

\* - Office hours may also available by appointment (please arrange by email, providing at least 24-hours of advance notice)

**Textbook:** "Supply Chain Management", Sunil Chopra and Peter Meindl (5<sup>th</sup> Edition)  
**Prerequisite:** IE 310 (required)

**Course Description:** This course is intended to be an introduction to operations research models used in manufacturing scenarios, with emphasis on supply chain management.

**Learning Outcomes:** Following the completion of this course, students should be able to...  
...develop a systematic framework for analyzing supply chain networks.  
...understand the typical firms in a supply chain and their role in supply chain performance  
...apply operations research models to improve supply chain performance

**Students with Disabilities:** All reasonable accommodations required for students with disabilities will be provided, as ensured by Article 1, Part 1 of the Student Code. Please alert the instructor by the end of the first week of class regarding accommodations, to ensure that accommodations can be made available when needed.

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**GRADING AND POLICIES**

Grades will be based on the following:	Midterm exam	35%
	Final exam	35%
	Homework assignments	15%
	Quizzes	15%

**Attendance:** You are expected to attend all course meetings and participate in class discussions. Important course announcements will be made during class; you are responsible for being aware of these announcements. Moreover, extra course-related opportunities or benefits may be provided to students who attend and participate in lecture, at the discretion of the instructor.

**Assignment Policies:**

- *Schedule:* Roughly five homework assignments will be collected throughout the semester.
- *Submitting Assignments:* Instructions for how to submit homework assignments will be provided. Please follow these instructions carefully! **Late submissions will not be accepted!** To accommodate unanticipated tardiness, each student's lowest homework score will be dropped.
- *Assignment Groups:* You may submit assignments in groups of up to three students, with the following restrictions:
  - (a) Groups must submit a group agreement form before the due date. Details will be available on Compass.
  - (b) Once a group has been formed, no new members can join that group.
  - (c) Each group must turn in one assignment; all group members will receive the same grade for the assignment.
  - (d) If you are a member of a group, you may decide to leave that group, but you cannot join another group (i.e., you must complete all future assignments on your own). You must notify the group members of your current group before leaving.

**Quiz Policies:** In-class quizzes will be held to assess understanding of the concepts covered in the course.

- *Schedule:* Quizzes will be held during lecture, and dates may or may not be announced in advance.
- *Attendance:* On some occasions, class attendance will count as a quiz grade, such that only students who attend the entirety of a particular class period are given full credit for the quiz.
- *Absences:* Make-up quizzes are not offered. Any student who is absent from a quiz will receive a grade of zero. To accommodate unavoidable absences that may occur during the semester, each student's lowest quiz score will be dropped. If you anticipate an extended period of unavoidable absences, please alert the instructor as soon as possible; such cases will be handled on a case-by-case basis.
- *Allowed materials:* Quizzes are closed-book and closed-notes. Calculators are not allowed on quizzes.

**Exam Policies:**

- *Schedule:* Exam dates will be announced in class.
- *Absences:* To ensure that student performance is assessed uniformly, make-up exams are only offered in rare circumstances. Missed examinations will receive a grade of zero. Make-up midterm exams will only be offered if required by University policy. However, I understand that extraordinary and unavoidable circumstances may arise that negatively impact midterm exam performance. To accommodate such circumstances, when determining each student's final course grade, their midterm exam score will be replaced by **the lowest of** (a) their final exam score, (b) the average of all their homework assignment scores, and (c) the average of all their quiz scores. Such replacement will only be applied if it improves the student's course grade; a student who takes a make-up midterm exam for any reason will not be eligible to replace their lowest midterm exam score in this way. Make-up final examinations are only offered if required by University policy, or a student has made arrangements with their college to receive an "I" (Incomplete) grade in the course. Please notify the instructor as early as possible if you believe you will need to take a make-up exam. Make-up exam arrangements will be made on a case-by-case basis.
- *Allowed materials:* Exams are closed-book and closed-notes. Calculators are not allowed on exams. **Cell phones and other electronic devices should not be brought to exams!**
- *Regrades:* To request that your exam be regraded, you must return your exam to the instructor within one week of when exams were first returned in class. **Do not write on or alter your exam in any way!** On a separate sheet of paper, provide a written explanation of why you believe additional credit should be awarded (and how many points), based on your work as it was completed when you originally took the exam. If you request a regrade, your entire exam will be reviewed and regraded.

**Cell Phones and Other Devices:** Please turn off all cell phones before class. Use of other electronic devices (tablets, laptops, etc.) is allowed for course-related purposes only. The instructor may restrict device usage for the benefit of class participation. Do not bring any electronic devices to exams.

**Graduate Students:** Each graduate students enrolled for four credit hours must complete an additional project, which will influence your final course grade. Deliverables will include a research paper and an in-class presentation. Topics will be decided in discussion with the instructor. Graduate students who are enrolled for four credit hours will be emailed more information after the second week of class; if you enroll in the course for four credits after this time, or otherwise do not receive this email, contact the course instructor at your earliest convenience to ensure you are able to complete project-related milestones by their deadlines.

**Computation Policies (Exams/Quizzes):** When answering questions requiring computations on an exam or quiz, you should report your answer using the simplest mathematical expression possible, to the extent that a final numerical answer could be easily obtained with a calculator. For example, you should report the expression  $(24 e^6) / (4 e^2)$  as  $6 e^4$ .

**Academic Integrity:** It is expected that your exams, quizzes, and project will contain only your own work, and that your assignments will contain only the work of your group. Any student who misrepresents their work in an exam, quiz, or project, or group who misrepresents their work on an assignment, will receive a grade of zero on that exam, quiz, project, or assignment; other sanctions may also be pursued, as allowed by University policy.

**NOTE:** The policies contained in this syllabus are subject to change. Any changes will be announced in class, and the current version of the syllabus will be updated on the course website (i.e., Compass2g).

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**TENTATIVE LIST OF TOPICS**

Introduction to Supply Chain Management	Inventory Models
Supply chain objectives and components	Cycle inventory models
Strategic fit and scope	Safety inventory models
Tradeoffs between efficiency and responsiveness	Replenishment policies
Demand and supply uncertainty	Optimal level of product availability
Drivers of supply chain performance	
Distribution Networks	Cross-Functional Drivers (time permitting)
Facility and transportation options and roles	Sourcing decisions (in-house vs. outsource)
Facility location and capacity allocation models	Design collaboration
	Procurement
Planning in the Supply Chain	Risk management in sourcing
Demand forecasting	Pricing and revenue management
Aggregate planning models	
Managing supply and demand	
Supply chain coordination	
Designing Global Supply Chain Networks	
Offshoring decisions	
Risk management	
Decision-making under uncertainty	