ISE53 Modelling and Analysis of Supply Chains

Spring 2014

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Office hours: By appointment

Teaching Assistant: Mr. Po-Chen Lin, office hours TBA.

Course Objectives: To expose students to the basic issues that need to be considered in operating supply chains, and a variety of modelling tools available for their analysis. Emphasis is on using engineering models to develop insights into the behavior of these systems.

Prerequisites: Knowledge of calculus-based probability and statistics at the level of ST371/372. Ability to use software to solve engineering problems, such as Microsoft Excel.


Students will also be required to purchase a course package containing the case studies used in the mini-projects. A number of articles will also be used; students can obtain these electronically from the NCSU Libraries.

Grading: Grades will be based the following:
- The course will involve three mini-projects in which students will work in groups of three to develop a solution to an open-ended problem in the area of supply chain management. A formal technical report will be required for each project. (30% of course grade)
- Periodic homework assignments (10% of course grade). There will be approximately 6-8 assignments over the course of the semester that will involve significant computer usage.
- Two midterm exams (30% of course grade) and a comprehensive final exam (30% of course grade).

Academic Integrity: It is understood and expected that all work turned in under your name is your own work or, if a group assignment, the work of you and your group members, and that you have neither given nor received unauthorized aid. The University policy on academic integrity can be found in the Code of Student Conduct (see Appendix L of the Handbook for Advising and Teaching: www.fis.ncsu.edu/ncsulegal/41.03-codeof.htm).
**Incomplete Grades:** If requested by a student, the grade of Incomplete may be given for work not completed because of a serious, documented interruption in the student’s work not caused by their own negligence.

**Absences and Scheduling Make-up Work:** No makeup examinations or homework assignments will be scheduled. In the event that a student has an excused absence (see http://www.ncsu.edu/provost/academic_regulations/attend/reg.htm for NC State’s policy on excused absences), the grade for the missed work will be assigned to the final examination.

**Students with Disabilities:** Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653 (http://www.ncsu.edu/dss/). For more information on NC State’s policy on working with students with disabilities, please see http://www.ncsu.edu/provost/hat/current/appendix/append_k.html.

**Course Outline:** The following list of topics will be addressed as the core of the course:

1) **Introduction to supply chain management:**
   - Fundamental issues and trade-offs in supply chain management.
   - Historical evolution of supply chain management.

2) **Inventory Management and Risk Pooling:** Snyder and Shen Chapter 4; instructor’s notes
   - Stochastic inventory models: base-stock policies and (Q,R) policies, forecasting, lead times, defining and measuring service level in inventory systems.
     - (Eppen and Martin 1988)

3) **Multi-location inventory models:** Snyder and Shen Chapters 5 and 6
   - Risk pooling, inventory sharing and transshipment, heuristics for multi-echelon inventory control.
     - (Shang and Song 2003), (Graves and Willems 2000)

4) **Supply Chain Dynamics: The Bullwhip Effect:** Snyder and Shen Chapter 10

5) **Supply Chain Contracts:** Snyder and Shen Chapter 11

**References**
