MGSC 875 – SUPPLY CHAIN COORDINATION AND CONTROL.
Fall 2007 PRELIMINARY

Instructor: Dan Steele
Office: BA 711
Office Hours: TBA
Phone: 777-6824 (office); 790-1641 (home, before 9 pm)
E-mail: steele@moore.sc.edu
Web: http://blackboard.sc.edu/

Required Material


Optional Material

- Jones and Womack, *Seeing the Whole; mapping the extended value stream* (Version 1.1), The Lean Enterprise Institute, 2003 (ISBN 0-9667843-5-9). Available at the Institute as a set with Rother's, both for $106.

The Vollmann text is an extensive reference for all CPIM exams and includes the basic information needed for this course. The Arnold text is much more compact and currently I plan to use it as a succinct basis for lecture in the first half of the course. It is not necessary for the course, but provides a more direct presentation of MRP management basics. It is the only text resource required for the first CPIM exam, *The Basics of Supply Chain Management*. The Rother text will be used later in the course and not only provides a very useful mapping tool for lean systems, but develops helpful supply chain perspectives. The Jones text specifically addresses the supply chain context, but is not extensive. Reference pages for Drum-Buffer-Rope discussion will be made available.

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1 APICS is the Association for Operations Management. Student membership is $20, but requires a faculty signature and mailed application. Student chapter code is S147. See the APICS web site at http://www.apics.org for membership details, application form, and the bookstore.
Content and Objectives

Today it is not just firms that compete, entire supply chains compete. The dependency of one firm on the other in a supply chain means that finding strategic partners is not enough. Firms must also be able to routinely and reliably coordinate operations in ways that exploit partnering within the system, not just within individual links. This leads to two difficulties. One is that internal systems that structure decisions within the individual firm -- strategic focus, capacity rates, product schedules, inventory positioning, and delivery promising – may not be effective in and of themselves. Poor system choice, implementation, or more likely, management policy results in reduced performance. But even if internal systems are well executed, the second difficulty may surface, the failure to exploit these systems’ characteristics for inter-firm performance. Either is sufficient to render a supply chain non-competitive.

This course has two aims. One is to provide a working knowledge of what state of the art planning and control approaches exist, when an approach is appropriate, and how management policy and implementation exploits their capabilities. Essentially three approaches are being mixed and matched within firms today: (1) transaction data base systems (MRP II and more extensive ERP), (2) flow control systems (such as Drum-Buffer-Rope or CONWIP) and (3) Lean Systems (Just-in-time). A managerial perspective is taken on all three, including a ERP simulation called ITEC for experiencing one practical example and Value Stream Mapping for hands-on experience with lean system coordination. Understanding these systematic approaches to coordination is the primary objective of the course, though a second aim also exists.

The second aim is to understand how individual firms can be linked to provide supply chain performance that is more than the sum of the parts. Necessarily one must know internal systems in order to understand delivery and information characteristics. Indeed, in many ways, supply chain coordination is internal coordination writ large. But within a supply chain, one must also see how delivery and information characteristics are combined with strategic inventory positioning and coordinating mechanisms to create timely and efficient flows of material between firms.

Material addressed in this course can provide the background necessary to completion of two of the five examination modules of the widely recognized professional Certification in Production and Inventory Management (CPIM). Completing material leading to exam 1 should prepare the student for successful completion of the first module in CPIM), Basics of Supply Chain Management. Completion of the course, and some additional review, can lead to completion of a second CPIM examination, Detailed Scheduling and Planning.

Because of the supply chain interaction with all business functions, this course is useful for any business concentration, but it is most valuable for those considering careers in manufacturing, distribution, purchasing, logistics, or other supply chain positions. It is also useful for those building expertise for consulting on supply chain issues. Our specific objective is to provide a working knowledge of the ways progressive firms are
coordinating product delivery service while controlling cost. Based on this class, you should be able to understand the basic design and operating decisions encompassed in planning system selection and operation. You should be able to fluently discuss this subject with a manager from any line function: Manufacturing for system design and operating policies, Marketing, Sales, Procurement, and other supply chain members for coordination of deliveries and inventory, Finance for understanding and predicting cost/revenue effects, and together how all of these activities provide for supply-chain and business-wide performance.

In particular, you should know the following:

1. **Language** - Language and framework of planning and control activities.
2. **Policies** - Management planning policy choices and their effect on the business enterprise.
3. **Systems** - Current system structures for coordination
   a. Material Requirements Planning (MRPII and ERP)
   b. Lean systems / pull scheduling (Just-in-Time)
   c. Constraint management / Drum-Buffer-Rope (DBR)
   d. Supply chain coordination and inventory positioning
4. **Value Stream Mapping** – Depiction of internal and extended value chains, their information and flow linkages, and potential for tight control loops

**Grading**

Grading is based on classroom activity and assignments, two reports, and two exams. The exams may be replaced by successful completion of Certification in Production and Inventory Management (CPIM) examinations.

Grades will primarily be drawn from these proportions:

- Mid-term exam or CPIM module 35%
- Final exam or CPIM module 35%
- Itec simulation report 10%
- Lean systems mapping report 10%
- Class activity 10%

Grades are generally set according to these standards:

- A=90, B=80, C=70, D=60
- Plus grades may be used for grades closely grouped near the cut-off.

Students are encouraged to replace the mid-term exam, the final exam, or both by successful completion of APICS certification exams approved by the instructor. The registration, scheduling, and accomplishment of the exam are the responsibility of the student and must be completed and reported by the scheduled time of the final exam. The format of the CPIM exams is computer-based multi-choice questions. The exams
may be taken at the Midlands Technical College (Harbison campus) or other locations in the southeast. CPIM information and testing center availability can be found at the APICS web site, http://www.apics.org.
<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic</th>
<th>Class Activity</th>
<th>Study Assignment(^3) (Read/Problems)</th>
<th>Submitted Assignment(^4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/28</td>
<td>Course intro; PP lecture</td>
<td>Arnold 1: read Arnold 2: read</td>
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<td>2</td>
<td>9/4</td>
<td>SOP application</td>
<td>Arnold 1: 3, 5</td>
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<tr>
<td>3</td>
<td>9/11</td>
<td>MPS lecture ; MPS application</td>
<td>Arnold 2: 2,4,9,10,15,18 Arnold 3: read Vollmann 6: read</td>
<td>PP exercise (I)</td>
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<tr>
<td>4</td>
<td>9/18</td>
<td>MRP lecture; MRP lecture</td>
<td>Arnold 3: 1, 3, 6, 7 Arnold 4: read; Vollmann 7: read</td>
<td>MPS exercise (I)</td>
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<tr>
<td>5</td>
<td>9/25</td>
<td>Capacity lecture; Itec lecture</td>
<td>Arnold 4: 2,3,6,11; Arnold 5: read Itec case: read</td>
<td>MRP exercise (I)</td>
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<td>6</td>
<td>10/2</td>
<td>Itec lecture &amp; demo; Itec trial decision</td>
<td>Arnold 5: 1, 2, 3, 6, 10, 11, 13, 15, 16</td>
<td>Itec policy (T)</td>
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<tr>
<td>7</td>
<td>10/9</td>
<td>JIT lecture; Pull exercise</td>
<td>Arnold 15: read</td>
<td>Itec decision #1</td>
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<tr>
<td>8</td>
<td>10/16</td>
<td>Exam (required)</td>
<td>Weeks 1-7 Notes/Article: read</td>
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<td>9</td>
<td>10/23</td>
<td>VSM lecture</td>
<td>Rother I, II: read Rother III: read</td>
<td>Itec decision #2</td>
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<tr>
<td>10</td>
<td>10/30</td>
<td>VSM lecture</td>
<td>Rother IV: read Case: prep</td>
<td>Itec decision #3 Map (I)</td>
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<tr>
<td>11</td>
<td>11/6</td>
<td>Control exercise, Intro; DBR lecture</td>
<td>Case: read TBA: read</td>
<td>Itec report (T)</td>
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<td>12</td>
<td>11/13</td>
<td>DBR problems; SCM lecture</td>
<td>TBA: read</td>
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<td>13</td>
<td>11/20</td>
<td>PAC lecture</td>
<td>Arnold 6: read</td>
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<tr>
<td>14</td>
<td>11/27</td>
<td>Beer game; TBA</td>
<td>TBA: read</td>
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\(^3\) If you are not using Arnold, see equivalent chapter in Vollmann, Berry, Whybark, and Jacobs text
\(^4\) I = Individual assignment; T = Team assignment
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<tr>
<td>15 12/4</td>
<td>VSM – Extended value stream Bullwhip effect</td>
<td>VSM lecture; Beer game revised</td>
<td>(Jones: read) Control changes (T)</td>
<td>VSM report (T)</td>
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<tr>
<td>12/14</td>
<td><strong>Final exam, Thursday, 2 p.m.</strong></td>
<td><strong>Comprehensive with emphasis on classes 8-15. This and/or the mid-term exam may be replaced by successful CPIM exams as approved by instructor</strong></td>
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