

# Syllabus

## IDS 752: Material Requirements Planning

Term: Fall 2005  
Instructor: Robert Judge  
Cell: 760-505-7075  
Email: rjhoo@yahoo.com  
Office hours: Thurs. 5:30 to 7:00 & by appt. Room: BA 314?

Textbook: Vollman, Berry, Whybark, and Jacobs, Manufacturing Planning and Control for Supply Chain Management, Fifth Edition, (McGraw-Hill, Irwin, 2005)

Software: E-Z-MRP Student Version (will be supplied for you)

**Course Description:** Global competition is a reality for most companies today. Manufacturing Planning and Control (MPC) Systems are essential to competitive success by allowing companies to: manage the material flow, schedule resources, and meet customer needs. Competitive success today implies that this is all done in a constantly changing environment which requires MPC Systems capable of handling rapid changes to product, material, process changes and integration with supply chains. This class will address various MPC Systems with an emphasis on MRP and will identify the appropriate system to use for a given corporate strategy. Instruction will address the important tools used to manage and control the inputs to the MPC system and the use of its outputs. The class has a large hands-on element where students will learn to develop a BOM, create a Master Schedule, load inventory records, process MRP, and evaluate capacity.

### Objectives:

- a. Develop understanding of MPC concepts and vocabulary
- b. Understand how MPC Systems must align with corporate goals and how they evolve over time.
- c. Demonstrate basic skills with MRP tools and knowledge of:
  - i. Strengths and weaknesses
  - ii. When to use tool
  - iii. Alternate tools
- d. Understand implementation and integration strategy and issues
- e. Develop hands-on experience in the use of a MRP system
- f. Collaborate with other students to produce project report and presentations displaying knowledge and its use by integrating class concepts.

- 2. Weekly Class Agenda:** 1) Review job market in S.D. for skill set related to week's topic, 2) Concept/Vocabulary review, 3) Lecture on topic theory, 4) Hands-on walkthrough of topic in E-Z-MRP using provided databases (Pen or Widget), 5) Student time to work on their project (teams of 3-5).

### 3. Topics covered:

Week	Subjects	Chp.
1	<b>Manufacturing Planning &amp; Control Overview</b> <b>Objectives:</b> <ol style="list-style-type: none"> <li>1) Syllabus review and expectations</li> <li>2) Why MPC essential to Corporate Competitiveness</li> <li>3) Types of MPC Systems</li> <li>4) Components of MPC Systems</li> <li>5) Corporate Strategies and influence on MPC System</li> <li>6) Importance of accurate inputs and control of variability</li> </ol>	1
2	<b>E-Z-MRP setup and overview</b> <b>Objectives:</b> <ol style="list-style-type: none"> <li>1) Load software to computers</li> <li>2) Walk thru fundamentals of software:               <ol style="list-style-type: none"> <li>a. setup BOM</li> <li>b. setup INV records</li> <li>c. Setup MPS</li> <li>d. Running MRP</li> <li>e. Running reports and exporting to Excel</li> </ol> </li> <li>3) Use PEN db for quick overview</li> <li>4) How to save intermediate files for backup</li> </ol>	
3	<b>Demand Management (Forecasting)</b> <b>Objectives:</b> <ol style="list-style-type: none"> <li>1) Review quantitative vs. qualitative models</li> <li>2) Forecasting in different MPC environments (MTS, ATO, MTO)</li> <li>3) Determine which model to use</li> <li>4) How to monitor forecast</li> </ol> <b>Class Activities:</b> <ol style="list-style-type: none"> <li>1) Page #55-56 Problem #s 7 and 8:</li> </ol> <b>For next week:</b> Choose teams select product and turn in Forecast for your team products	2
9/15		
4	<b>Sales and Operations Planning (SOP) - (aka. Aggregate Planning)</b> <b>Objectives:</b> <ol style="list-style-type: none"> <li>1) Function of sales and operations planning – why do it?</li> <li>2) The process of SOP</li> <li>3) Critical Issues</li> </ol> <b>Class Activities:</b> <ol style="list-style-type: none"> <li>1) Generate a planning strategy and SOP from data provided ( Problem #4: Ski &amp; Sea)</li> </ol> <b>For next week:</b> turn in SOP for your team products	3
9/22		
5	<b>Master Production Scheduling</b> <b>Objectives:</b> <ol style="list-style-type: none"> <li>1) The role of the MPS and the Master Scheduler</li> <li>2) The MPS process</li> <li>3) Use of non-engineering BOM to assist in producing a MPS</li> </ol>	6
9/29		

Week	Subjects	Chp.
9/29	4) Managing the MPS 5) Communication with Sales (ATP) <b>Class Activities:</b> 1) Problem #2: Neptune Manf. Company MPS 2) E-Z-MRP: Load “Pen” MPS, BOM, and Inventory <b>For next week:</b> turn in Master Production Schedule for products	
6 10/6	<b>MRP</b> <b>Objectives:</b> 1) Where does MRP fit in the MPC system? 2) What is the MRP process? 3) Technical issues (processing frequency, lot sizing, safety stock, low level coding, pegging, and FPOs). 4) What is the Role of MRP Planner? 5) How do changes to Inventory records, MPS, or BOM affect MRP records? <b>Class Activities:</b> 1) Handout problem for calculation of MRP records 2) E-Z-MRP: Run MRP for “Pen” data and review output <b>For next week:</b> turn in MRP output reports for your company	7
7 10/13	<b>Capacity Planning &amp; Utilization</b> <b>Objectives:</b> 1) At what stages in the MPC system is Capacity reviewed 2) Capacity control techniques at the various stages 3) Management of capacity <b>Class Activities:</b> 1) <b>First Team Presentations (15 minutes – see notes for topic)</b> 2) Load capacity factors for the “Pen” and run capacity reports 3) Problem #7: office supply company <b>For next week:</b> turn in capacity analysis reports for your company	10
8 10/20	<b>Production Activity Control</b> <b>Objectives:</b> 1) Where does PAC fit in the MPC system: what is its function and how does it vary with different MPC systems 2) What are the basic concepts and models 3) TOC: Theory of constraints (Drum-Buffer-Rope) <b>Class Activities:</b> 1) <b>First paper and Presentation due (10 minutes – Names A – L)</b> 2) Problem # 6: Priority scheduling rules <b>For next week:</b>	11
9 10/27	<b>DRP</b> <b>Objectives:</b> 1) Where does DRP fit in or relate to the MPC system? 2) How is DRP used to manage the supply and demand of inventories in the field? 3) How do organizational issues affect effectiveness of DRP?	8

Week	Subjects	Chp.
	<b>Class Activities:</b> 1) Problem #5: XYZ company DRP <b>For next week:</b>	
10	<b>ERP</b> <b>Objectives:</b> 11/3 1) Definition of ERP – what is its relevance? 2) How does ERP connect with and help the MPC process 3) Importance of performance metrics 4) Implementation issues and results <b>Class Activities:</b> 1) What performance metrics are relevant for your company and how would you calculate them (be innovative?) 2) What might be the biggest roadblocks to implementing ERP in your company <b>For next week:</b> Identify 10 system requirements for selecting an ERP package – and then choose one. Bring to class to discuss	4
11	<b>Product Design</b> <b>Objectives:</b> 11/10 1) Understanding that Product Design is a key factor in Competitiveness and in Process Design and MPC selection 2) Impacts on: equipment selection, quality, reliability, variability in the process, economics, manufacturability 3) Product development cycle and QFD 4) Standardization, mass customization, delayed differentiation <b>Class Activities:</b> 1) <b>Second team presentations (1/2 of teams – see notes for topic)</b> <b>For next week:</b>	3
12	<b>Process Selection (Product, Factory Layout, JIT, line balancing)</b> <b>Objectives:</b> 11/17 1) Impact on Capacity, Flow, Equipment, ... 2) Process strategy – flexibility in volume and design changes 3) Types of Process flows 4) Product vs. Process Layouts 5) Balancing an assembly line <b>Class Activities:</b> 2) <b>Second team presentations (1/2 of teams – see notes for topic)</b>	4
<b>THANKSGIVING</b>		
13	<b>JIT</b> <b>Objectives:</b> 12/1 1) JIT key features, benefits, and how do they impact the MPC system 2) Non-repetitive JIT 3) Supplier coordination 4) JIT software	9

Week	Subjects	Chp.
12/1	<b>Class Activities:</b> 1) <b>Second paper and Presentation due (10 minutes – Names M - Z)</b> 2) Problem #8: GHI company mixed-model MPS <b>For next week:</b> turn in a mixed-model MPS for your products given your original MPS data	
14	<b>Supply Chain</b> <b>Objectives:</b> 1) Basic concepts 2) Performance measurement 3) Order quantities (lotsize, safety stock and risk pooling) 4) Other topics (Logistics and Knowledge transfer) <b>Class Activities:</b> 1) Risk Pooling game	17
15	<b>Final Exam</b>	
12/15		

4. **Field Trip:** Goodrich or Raytheon?

**5. Assignments:**

- a. Team Project Notebook: Composed of homework assignments. Each assignment must have a cover page, list of assumptions used and why, and results printed from E-Z-MRP.
- b. Two short papers ( suggestions: Lotsizing, MPC Design considerations, Future MPC directions, Implementing a system, control of variability, ...: text has numerous topics and starting references). Maximum 3 pages, single spaced, minimum 3 references. Presentations on paper 10 minutes.
- c. Class team presentations:
  - i. Midterm: Corporate Strategy, Product description, Forecast, Production Plan, MPS
  - ii. End of Term: MRP, Capacity planning, Product and Process design, Shop scheduling

**6. Project Notebook**

- a. 2-3 master schedule items (i.e. high end, middle of the road, and low end closely related products)
- b. Each MS item has a BOM of 10 – 15 components and 3 or more levels
- c. Should have common parts
- d. Create special reports – downloads into Excel as helpful/relevant
- e. Intermediate deliverables:
  - i. BOM
  - ii. Forecast/Prod Plan/Master Schedule
  - iii. MRP processing (shop reports)
  - iv. Capacity Analysis

