

## *ERP (21-550)*

*Advanced Manufacturing Laboratory  
Department of Industrial Engineering  
Sharif University of Technology*

*Session #7*



### *Course Description*

#### ▪ *Instructor*

- *Omid Fatahi Valilai, Ph.D. Industrial Engineering Department, Sharif University of Technology*
- *Email: [FValilai@sharif.edu](mailto:FValilai@sharif.edu), Tel: 6616-5706*
- *Website: [Sharif.edu/~fvalilai](http://Sharif.edu/~fvalilai)*

#### ▪ *Class time*

- *Sunday-Tuesday*                      *16:30-18:30*
- *Wednesday*                              *09:00-12:00*

#### ▪ *Course evaluation*

- *Mid-term*                                      *(30%)*
- *Final exam*                                      *(40%)*
- *Quiz*    *(5%)*
- *Exercise*                                        *(10%)*
- *ERP Lab*                                        *(15%)*



## Course Description (Continued ...)

- **Mid-term session:**
  - Sunday : 8<sup>th</sup> Azar 1394, 16:30 ~ 18:00
- **Final Exam:**
  - Sunday: 27<sup>th</sup> Dey 1394, 09:00 ~ 10:30
- **Reference:**
  - Shtub, A., "Enterprise Resource Planning (ERP)- The dynamics of operations management", 2002, Kluwer Academic Publishers
  - Ptak, Carol A., "ERP Tools, Techniques, and Applications for Integrating the Supply Chain", 2004, The CRC Press
  - Fui, F., Nah, H., "Enterprise Resource Planning", 2002, IRM Press

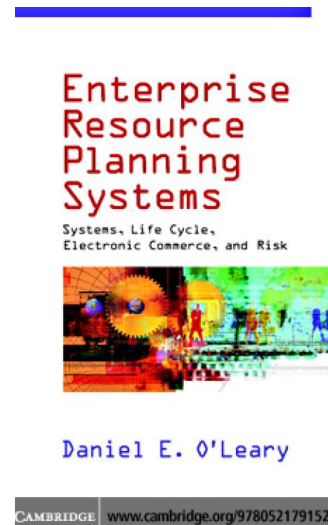
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- **Reference:**
  - Daniel E. O'leary, "Enterprise Resource Planning Systems Systems, Life Cycle, Electronic Commerce, and Risk", 2000, Cambridge University Press



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## *Course Description (Continued..)*

- *Contents:*
  - *Enterprise Management*
  - *Operations Management*
  - *The Evolution of ERP Systems: A Historical*
  - *Organizations and organizational structures*
  - *Scheduling*
  - *Purchasing and inventory management*
  - *Marketing considerations*
  - *ERP selection and implementation*

## *Course Description (Continued..)*

- *Contents:*
  - *Enterprise Management*
    - *History of Enterprise Resource Planning*
    - *The Theory of Constraints and ERP*
    - *Sales and Operations Planning*
    - *Buffer Resource Strategy*
    - *Enterprise Resource Management*
    - *Integrating the Supply Chain to Reap the Rewards*
    - *Strategic Sourcing and Procurement*

## *Enterprise Management*

- *Contents:*

- *The Theory of Constraints and ERP*
  - *The DBR Technique*
  - *TOC is looking for the weakest link in the chain.*
- *The sequence of operations uses internal resources to turn raw materials into finished products. Later, external variables, such as market demand and availability of materials, should be considered as well.*
- *Only a very few weak links can be found in any net.*

## *Enterprise Management*

- *Contents:*

- *The Theory of Constraints and ERP*
  - *The DBR Technique*
  - *In the shop floor the links are actually resources.*
- *Only very few resources, usually just one, put a true limit to the production pace.*
- *That means that any realistic planning should focus on that resource that lacks capacity the most.*
- *The rest of the system has excess capacity that helps to keep the planning of the critical resource intact.*

## Enterprise Management

### ▪ Contents:

- *The Theory of Constraints and ERP*
  - *The DBR Technique*
  - *When the market demand is lower than the capacity of the critical resource, the pace of the whole system should be fully dictated by the market demand.*
  - *When the demand approaches the limit imposed by the most loaded resource, that particular resource becomes a capacity constraint resource (CCR).*
  - *It is the balance between the demand and the CCR that dictates the actual pace of the system.*
  - *Sensible planning of the shop floor must adhere to both the market demand and the capacity of the CCR.*
  - *This planning of the output of the system is called the Drum.*

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## Enterprise Management

### ▪ Contents:

- *The Theory of Constraints and ERP*
  - *The DBR Technique*
  - *The Drum must be protected from Murphy's Law (whatever can go wrong will).*
  - *Theoretically, all the other parts of the system have enough flexibility to support the Drum because of their excess capacity.*
  - *However, temporary peaks of load and incidental delays may interfere and waste the precious capacity of the CCR or simply cause a shipment to miss the due date.*

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## Enterprise Management

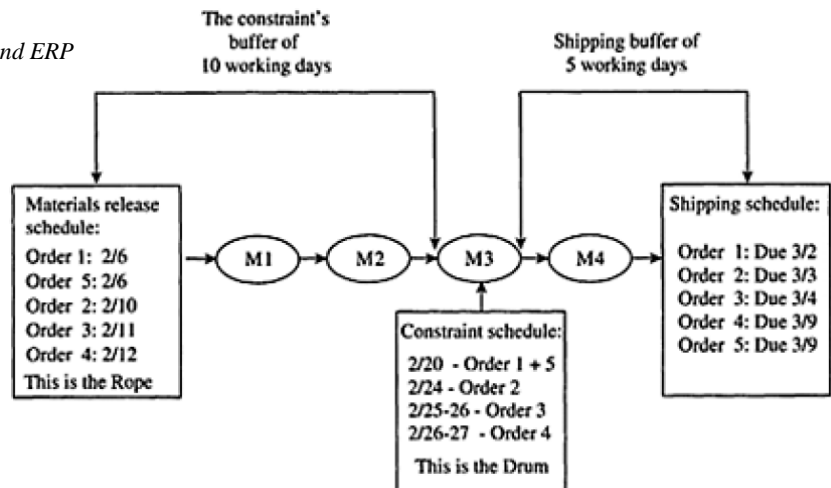
- *Contents:*
  - *The Theory of Constraints and ERP*
    - *The DBR Technique*
    - *In order to protect the CCR and the commitments to the market, a protection mechanism must be established. This is called a buffer.*
  - *The TOC notion of a buffer is somewhat different than its common use. A buffer, according to TOC, is designed to protect only the critical areas, the areas that control the performance of the whole system.*
  - *In the TOC terminology, they are the physical constraints of the system.*
  - *In a make-to-order environment the buffer is expressed in time units and is called time buffer.*

## Enterprise Management

- *Contents:*
  - *The Theory of Constraints and ERP*
    - *The DBR Technique*
    - *In order to support the proper flexibility of the nonconstraint resources, no material is allowed to be released to the floor prior to the time determined by the Drum minus the buffer time.*
      - *This is called the Rope—a mechanism that guards that no materials will be released before the scheduled time*
    - *Implementing the Rope means to knowingly underutilize the resources that are nonconstraints (having excess capacity).*
    - *TOC logic points out that there is no point to fully utilize resources that have excess capacity.*

## Enterprise Management

- **Contents:**
  - *The Theory of Constraints and ERP*
  - *The DBR Technique*



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## Enterprise Management

- **Contents:**
  - *The Theory of Constraints and ERP*
    - *The DBR Technique*
    - *DBR is certainly different from material requirements planning (MRP).*
    - *First of all it does consider finite capacity within the planning.*
    - *It does not use lead-times between any levels in the BOM. Instead it uses time-buffers to cover all the way from material release to the CCR and from the CCR to completion.*
    - *While the concept of the time-buffer is similar to the MRP concept of lead-time, the actual use is quite different.*
    - *DBR strives to have the MPS as simple as possible—only the shipping dates of the firm orders are required.*
    - *Recognizing that make-to-stock is quite necessary, DBR has been adjusted to deal with stocked products.*

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