

NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATION 2001

Master of Engineering Science and Master of Applied Science Degrees**INTEGRATED MANUFACTURING SYSTEMS**

Professor Ed Wright
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Time allowed : 2 hours

Answer 4 questions.

1. Two well-known typologies of manufacturing are those based on Customer Order Decoupling Point (CODP) and Product Complexity / Demand patterns.

Discuss the two typologies and indicate the insights they offer into manufacturing systems analysis and design.
2. Outline a business process model of the Extended Enterprise (EE) with which you are familiar, describing the main business process and the actors involved in them. Further use the business process model to indicate the difference between the CIM (Computer Integrated Manufacturing) and EE approaches. Indicate how your model might be expanded to incorporate EOL (End of Life) resource recovery.
3. Discuss the main production oriented modules of an ERP (Enterprise Resource Planning) system making particular reference to the master schedule module, the requirements planning module and the production activity control / shop floor control / manufacturing execution system module. In your answer also make clear the distinction between finite and infinite scheduling and the respective roles of RCCP (Rough cut Capacity Planning) and CRP (Capacity Requirements Planning).
4.
 - (a) What do you understand by the term “concurrent engineering”. Why is it an important approach to the design of products?
 - (b) Explain the use of parametric representation in CAD systems, making reference to the Bezier and Hermite models.

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5. (a) What do you understand by the term “manufacturing strategy”? Explain the Hayes and Wheelwright model of manufacturing strategy, distinguishing clearly between structural and infrastructural elements.
- (b) Write a brief note on the scope and issues to be considered in developing the “capacity” statement within a manufacturing strategy document.
6. Write short notes on four of the following topics:
- (i) Lot sizing in ERP (and MRP) systems.
 - (ii) A procedure to develop a manufacturing strategy statement.
 - (iii) Design Processes and Design Models.
 - (iv) Finite and Infinite Scheduling Systems.
 - (v) Scheduling Heuristics and Bottleneck Scheduling.