OBJECTIVES:
As the first of a two-course graduate-level series on Production Systems, this course focuses on the
design of production systems; however can be seen as an applied OR course. A wide range of
design problems encountered in modern manufacturing environments are covered with particular
emphasis on advanced quantitative modeling and solution techniques. In addition to the
fundamental work in the area, some very recent additions to basic problem definitions and newer
approaches will also be addressed through paper discussions.

Requirements: IE 202, IE 312 or equivalent (or, basic knowledge about Integer Programming and
production systems)

COURSE CONTENTS:

1. Introduction
   1 class

2. Facility Layout
   10 classes
   Advanced models and algorithms; Branch and Bound, Meta-heuristics,
   Graph theoretic approaches; Next generation factory layouts

3. Group technology and cellular production systems
   8 classes
   Production flow analysis; Similarity coefficient based approaches;
   Mathematical programming methods; multiple routings and capacity considerations

4. Flexible Manufacturing Systems
   6 classes
   The concept of flexibility; models for FMS design and short-term planning problems

5. Facility Location, Distribution and Logistic systems
   12 classes
   Continuous and discrete space location models; Location/allocation models;
   Capacitated, multi-echelon, multi-period models; Undesired facilities


READING MATERIAL: Along with several journal papers, chapters from the following books
will be used
   - Singh, N., and Rajamani D., Cellular Manufacturing Systems: Design, Planning And
     Control, Chapman and Hall, 1996.
     Wiley and Sons, 1993.
   - Groover, M.P., Automation, Production Systems, and Computer Integrated Manufacturing,

GRADING:
Midterm : 25 %
Final* : 25 %
Paper Presentation : 25 %
Assignments : 20 %
In-class participation : 5 %

*Student who have taken the midterm, submitted all assignments and performed all assigned presentations
can take the final exam.