

Spring 2005 IEM 5990, 352, CID#18361
RFID Applications in Manufacturing Systems:
 (Towards Improving Quality and Integrity Assurance)
 Schedule: 4:30-7:10M 316 EN

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GOALS AND OBJECTIVES

This course provides a seminar oriented experience to introduce the basic elements of the emerging discipline of Radio Frequency Identification (RFID) and related sensing technologies, and their applications to the various aspects of manufacturing systems. The focus will be on studying the data management, abstraction issues that have a direct bearing on improving the quality and integrity of Manufacturing and Supply Systems.

TEXT AND OTHER READING/INSTRUCTIONAL MATERIALS

Required: Article collection mostly from MIT's AutoID Labs
 Supplementary: Finkenzeller, RFID Handbook, Wiley, 2003.

EXPECTED OUTCOMES

- Ability to describe the various components of an RFID system
- Ability to describe the impact of an RFID system on Manufacturing, Defense, Distribution, Retail and Health Sectors
- Ability to describe the data management and interpretation challenges in RFID systems
- Ability to describe the methods to abstract ("filter") information in RFID and other sensor networks
- Ability to describe the future advances to the quality and integrity of Manufacturing and related sectors resulting from the use of RFID and other sensor technologies

COURSE EXECUTION

This course will consist of a series of structured seminars (from both the instructor and his peers in industry and academe) to build learning experiences in various aspects of RFID systems and their applications. The in-class learning will be augmented through student-led seminars that will present the various tasks accomplished as part of their course project. The table summarizes the tentative syllabus for this course:

Duration	Contents
I. Introduction	
2 Weeks	What is RFID technology? What are its applications and benefits to various industries? What are the components of an RFID System? How does an RFID System work?
II. RFID Tags	
1 Week	About RFID tags, EPC and UID standards.
III. RFID Systems	
4-5 Weeks	Applications to Object and Asset Tracking. Supply Networks Retail Stores Live Stock Tracking Depot Inventory Tracking
IV. RFID Sensors	
4-5 Weeks	Application to Condition Monitoring Machine Condition Energy System Condition Automobile Condition
1-2 Weeks	V. Middleware and Other Issues
1-2 Weeks	VI Data Management Issues
1 Week	VII. Project Presentations and Course Wrapup

COURSE PROJECT

Field Study in a particular class of industry including: Defense, Homeland Security, Manufacturing Machines Operations, Supply Networks, and Energy Industries.

The objective is to understand and detail the Current practices, Specific challenges, Recommendations on best practices, and Analysis to justify the recommendations.

Possible opportunities exist for project teams to work with specific companies to conduct their studies.

GRADING SYSTEM

1. Weekly presentations: 40 %
2. Project: 40%
3. Mid-term (Project proposal): 10%
4. Class Participation: 10%

* He conducts research on Sensor-based Modeling--a new approach based on augmenting statistical and intelligent systems foundations of traditional monitoring systems with nonlinear dynamic systems theory--for improving quality and integrity of manufacturing machines and processes, and other real-world complex systems. His recent research pursuits are available at <http://www.usc.edu/dept/ise/nmcl>.