

## **ME/MFG-587 GLOBAL MANUFACTURING**

**Class instructor:** Professor Yoram Koren,  
Director, NSF ERC for Reconfigurable Manufacturing Systems

### **Prerequisites**

Graduate engineering students, and seniors who have taken design and manuf. classes.  
Business school students; MBAs; Tauber Institute Students.

This course is aimed to assist engineers who desire to pursue managerial careers in the manufacturing industry, and students in business schools who are motivated to lead global manufacturing companies.

### **Course Rationale**

Like it or not, globalization is here, and has a direct impact on industry, as well as the economy and our life. Globalization creates both opportunities and challenges for companies who manufacture durable goods, such as automobiles, furniture, and appliances. The main challenge is how to succeed in a turbulent business environment, where all competitors have similar opportunities?

To succeed in this unstable environment, a revolution is needed in restructuring the three main units of manufacturing enterprises: product design, manufacturing, and business. In the product design, an accelerated pace of innovative products with short leadtime from concept to sale is needed. This must be combined with a new type of manufacturing system that can be rapidly changed and reconfigured to produce the new products, and respond to changes in market demand. The business model must be agile and responsive to new market opportunities.

The speed of responsiveness, shorter lead-times in product innovations, and integration between product, process, and business are three critical cornerstones of the current revolution in the global manufacturing enterprises. A company can succeed in globalization only if it has a sound strategy for developing innovative products, plants with reconfigurable manufacturing systems, and business models with growth strategy. These topics are covered in detail in this book.

Analyzing the technical and business dimensions of past and current manufacturing paradigms is necessary to understand the current revolution in global manufacturing enterprises. The major paradigms are mass production, lean production, mass customization and, most recently one of personalized production. This course introduces an original approach to the analysis of these paradigms, suggests methods for developing creativity in product design (especially design for global markets), presents a quantitative analysis of manufacturing system configurations, discusses the globalization impact on supply chains, and presents an original approach to the use of information technology for workforce empowerment.

## **Class Topics**

### **Globalization and Manufacturing Paradigms**

Global Integration of Engineering and Business; Customer Role in the Manuf. Paradigms

### **Product Invention Strategy**

Technology-Driven Products; Customer-Driven Products; Competition-Drive Product  
Product Development for Globalization

### **Customized, Personalized, Reconfigurable Products**

Design for Mass Customization; Personalized Production; Reconfigurable Products

### **Mass Production and Lean Production**

Mathematical Model of Mass-Production; The Principles of Lean Production

### **Analysis of Mass Customization**

Business Strategies of mass Customization

### **Traditional Manufacturing Systems**

Comparison Between dedicated lines and flexible manufacturing systems

### **Reconfigurable Manufacturing Systems**

The Challenge of Globalization; Reconfigurable Manufacturing Systems–RMS  
System-Level Design Issues in RMS; System Rapid Ramp-UP

### **Reconfigurable Machines**

The Rationale for Reconfigurable Machines; State of the Art of Modular Machine Tools  
RMT Design Methodology and Prototypes; Reconfigurable Inspection Machine

### **Manufacturing System Configuration Analysis**

Configuration Classification; Comparing RMS with Cell Configurations  
Number of RMS Configurations; Impact of Configuration on Performance

### **Responsive Business Models**

Business Model Structure; Competitive Advantage; Strategic Resources  
Diversification Global Strategies; Responsive Business Models for Global Opportunities

### **Enterprise Globalization Strategies**

Why Enterprises Become Global; Countries of Potential New Markets  
Product Design for Globalization; Manufacturing Plants – Location and Type  
A Global Manufacturing Strategy; Global Strategic Alliances; The Dilemma of Globalization

### **A Responsive Organizational Structure**

Twenty-First Century Organizational Structure; Information Transfer in Manufacturing Systems  
Global Supply-Chain Management