

PENNSTATE



The Harold and Inge Marcus  
Department of Industrial and Manufacturing  
Engineering

# Toward a Curriculum for Service Enterprise Engineering

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# A Traditional IE Department

- Historical emphasis on manufacturing processes
- Operations research, IT and human factors in support of manufacturing
- Primary relationships established with manufacturing organizations





# Our Changing Landscape

- Profile of employers changing
- Student interests evolving
- Gentle, but consistent alumni feedback



# Roadmap to Transition

- Step 1: Recognize delivery of service as an application area for engineering
- Step 2: Establish the Service Engineering Alumni Advisory Group
- Step 3: Curriculum review and reform
- Step 4: Introduction of case studies
- Step 5: Publicize changes to students and employers



# 1. IE “Toolkit” for Service Delivery

- Operations Research
- Engineering Economy



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- **Statistical Process Control**



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- Operations Research
- Engineering Economy
- Human Factors and Job Design
- Statistical Process Control
- **Metrology**
- **Manufacturing Systems**



## 2. Service Engineering Advisory Board

- Established in 2003 with 12 alumni with senior executive alumni positions in the service sector
- Industries include security, healthcare, finance, IT, call centers, transportation, entertainment, consulting, education
- Bi-annual meetings with faculty and staff



# 3. Moving Toward a World-Class Industrial Engineer

- Aware of World
- Solidly Grounded
- Technically Broad
- Group Operations
- Versatile
- Customer Oriented



# Mapping to the World Class Industrial Engineer

- Aware of World →
- Solidly Grounded → IE Fundamentals
- Technically Broad →
- Group Operations → Teams & Communication
- Versatile →
- Customer Oriented →



# Elements for New Curriculum

- Instantiate the *service sector* as an application area for engineering skills
- Provide a *global context* for engineering and develop skills necessary to compete in a worldwide economy



# Moving Toward a World Class Industrial Engineer

- Aware of World → Global Context
- Solidly Grounded → IE Fundamentals
- Technically Broad → Learn to Learn
- Group Operations → Teams & Communication
- Versatile → Service Sector
- Customer Oriented → Industrial Projects



# What Looks Different?

- **Track in Service Enterprise Engineering**



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- **Capstone Design projects with Wal-Mart, UPS, Allegheny Health, ICT, U.S. Security, Redcats**



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- **Required Course in “IT for Industrial Engineering”**



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- Capstone Design projects with Wal-Mart, UPS, Allegheny Health, ICT, U.S. Security, Redcats
- Required Course in “IT for Industrial Engineering”
- **New elective in “Service Enterprise Engineering”**



## 4. Introduction of Service-Oriented Case Studies

- Partnership between faculty member and SEE Board
- Spend summer collaborating to include service-oriented case studies in non-lab courses
- First set offered in Fall, 2005 with positive student feedback



# Case Study Courses Include...

- Engineering Economy
- Engineering Statistics
- Introduction to Work Design
- Simulation Modeling for Decision Support
- Operations Research
- Linear Programming
- Manufacturing Systems Design and Analysis



## 5. Getting the Word Out

- Undergraduate Speaker Series
- Service Engineering Senior Design Projects
- Employer Recruitment
- ASEE Prism Article



# Current State

- ✓ Recognize delivery of service as an application area for engineering
- ✓ Step 2: Establish the Service Engineering Alumni Advisory Group
- ✓ Step 3: Curriculum review and reform
  - Step 4: Introduction of case studies
  - Step 5: Publicize changes to students and employers