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Engineering Education in Service Systems

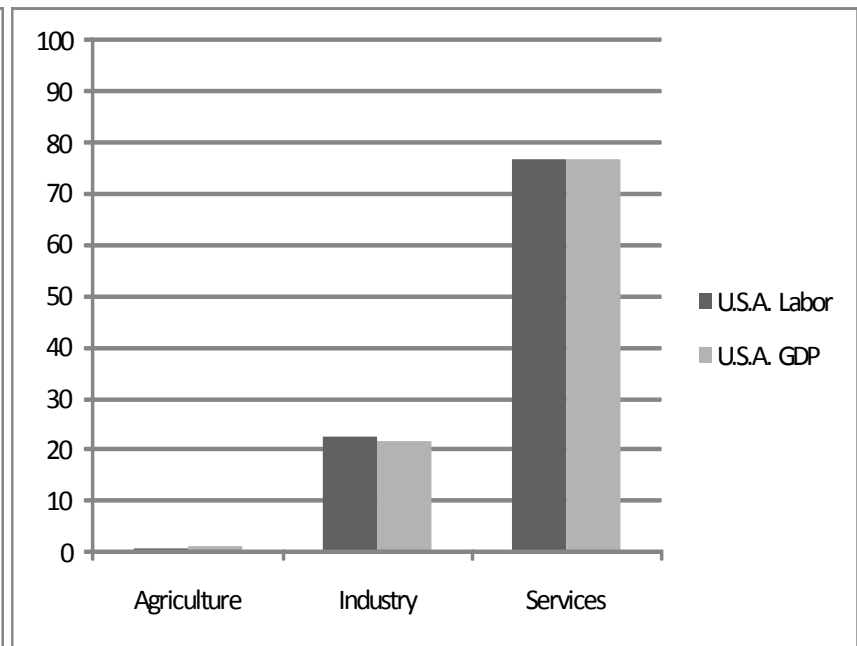
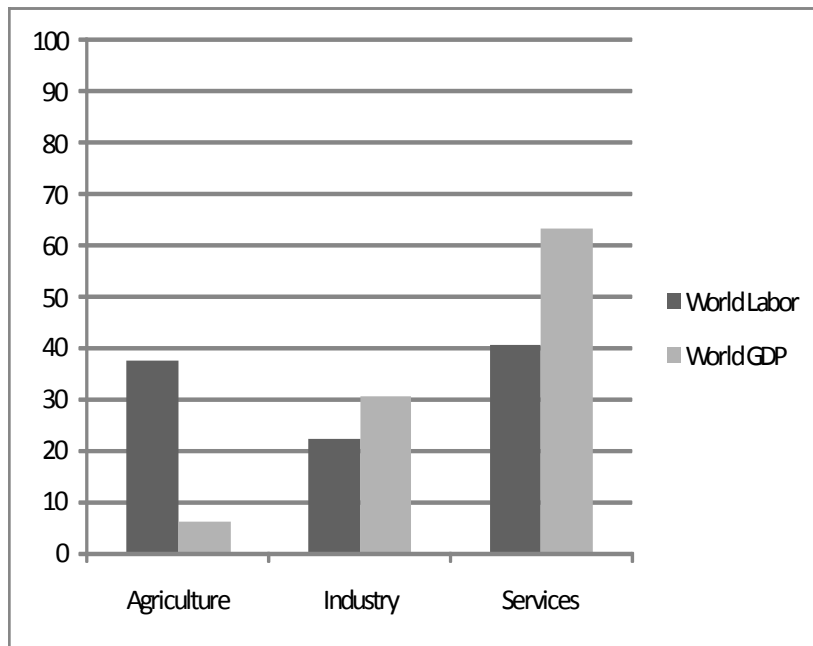
Outline

- Introduction
- Undergraduate curriculum
 - Curriculum
 - Specialization Track: Engineering Service Systems
- New courses
- Center for Service Enterprise Engineering (CSEE)

Introduction

- Services
 - E.g. advertising, broadcasting & news, consulting, education, entertainment, financial services (stock brokering, banking), government services, etc.

World economy and labor



Undergraduate Curriculum

- Curriculum revision in 2005
 - *Major innovation*: specialization tracks in manufacturing systems, service systems, and information systems to equip engineers for new opportunities
 - *Emphasis*: educating students on the principles, tools and techniques of the industrial engineering profession which can be applied to these tracks

Undergraduate Curriculum (cont.)

- During the first two years

<u>1st Semester</u>			<u>2nd Semester</u>		
<i>MATH 140</i>	<i>Calculus I</i>	4	<i>MATH 141</i>	<i>Calculus II</i>	4
EDSGN 100	Engr. Design & Graphics	3	<i>PHYS 211</i>	<i>Mechanics</i>	4
ENGL 15 or 30	Rhetoric & Composition	3	CHEM 111	Experimental Chemistry	1
<i>CHEM 110</i>	<i>Chemical Principles</i>	3	ECON 2 or 4	(Social Science)	3
Arts, Humanities, Social Sciences		<u>3</u>	Arts, Humanities, Social Sciences		3
		16	First-Year Seminar		<u>1</u>
					16
<u>3rd Semester</u>			<u>4th Semester</u>		
MATH 231	Calculus of Several Variables	2	MATH 220	Matrices	2
PHYS 212	Electricity & Magnetism	4	CMPSC 200, 201, or 202	Matlab C or Fortran Programming	3
CAS 100A/B	Effective Speech	3	MATH 250	Differential Equations	3
+E MCH 210 ^A	Statics & Strength of Materials	5	Science Elective ^B		3
Arts, Humanities, Social Sciences		<u>3</u>	~ Choose 6 credits from approved list		<u>6</u>
		17			17

Undergraduate Curriculum (cont.)

■ Courses required for the major

<u>5th Semester</u>			<u>6th Semester</u>		
+I E 302	Engineering Economy	3	+I E 323	Statistical Methods in IE	3
+I E 305	Product Design, Specification & Measurement	3	+I E 405	Linear Programming	3
+I E 322	Probabilistic Models in IE	3	+I E 330	Information Technology for IE	3
+I E 327	Introduction to Work Design	3	Choose a manufacturing processing course ^C		3
MATSE 259	Materials, Properties & Processing	3	Engl 202C	Technical Writing	3
Health & Physical Activity*		<u>1.5</u>	Health & Physical Activity*		<u>1.5</u>
		16.5			16.5

<u>7th Semester</u>			<u>8th Semester</u>		
I E 425	Intro to Operations Research	3	I E 453	Simulation Modeling for Decision Support	3
I E 408 or 419	Cognitive Work Design or Work Design-Productivity and Safety	3	I E 480 W	Capstone Design Course	3
I E 470	Manufacturing System Design & Analysis	3	Specialization Courses ^D		6
Specialization Course ^D		3	Arts, Humanities, Social Sciences		<u>3</u>
Arts, Humanities, Social Sciences		<u>3</u>			15
		15			

Undergraduate Curriculum (cont.)

■ Specialization Track: Engineering Service Systems

I E 408 Cognitive Work Design

I E 418 Human/Computer Interface Design

I E 419 Work Design - Productivity and Safety

I E 433 Regression and Design of Experiments

I E 434 Statistical Quality Control

I E 436 Six Sigma Methodology

I E 454 Applied Decision Analysis

I E 466 Concurrent Engineering

I E 467 Facility Layout and Material Handling

I E 468 Optimization Modeling and Methods

IE 497x Data Envelopment Analysis

I E 478 Retail Services Engineering

IE 497x Service Enterprise Engineering

IE 497x Healthcare Systems Engineering

BIOE 402 Bio medical Instrumentation and
Measurement

BIOE 406 Medical Imaging

C E 422 Transportation Planning

C E 424 Optimization in Civil Engineering Systems

Math/Stat 416 Stochastic Modeling

M E 446 Reliability and Risk Concepts in Design

STAT 462 Applied Regression Analysis

New Courses

- Information Technology for Industrial Engineering
- Retail Services Engineering
- Service Enterprise Engineering
- Competitive and Sustainable Industrial Enterprises
- Financial Engineering
- Financial Services for Enterprise and Supply Chain Engineering
- Distributed Systems and Control

Center for Service Enterprise Engineering

- Facts
 - Established within the Department in January 2007, first U.S. academic center for Service
 - Constitutes of 8 faculty members and 17 graduate students
 - Over \$1.4 million research funds from NSF, NIST, USDA, USDE, and the Ben Franklin's Center of Excellence Award
 - In 2008~2009, 12 presentations on leading 6 Conferences and 16 publications in leading journals

Center for Service Enterprise Engineering (cont.)



Revenue Management

- Pricing
- Resource allocation
- Demand management



Service Center Test Bed

- A customized off-line software package
- Simulates the real service enterprise environment
- Based on preset scenarios



Service Process Modeling

- Identifying the possible load on a service network
- Possibilities to increase efficiency
- Innovation and collaboration and User satisfaction

Thank you!
Q&A