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Lecture 1

Stage: forth

Subject: Industrial Engineering

Introduction of Industrial Engineering Lectures (1)

**Overview**

While the term originally applied to manufacturing, the use of "industrial" in "industrial engineering" can be somewhat misleading, since it has grown to encompass any methodical or quantitative approach to optimizing how a process, system, or organization operates. Some engineering universities and educational agencies around the world have changed the term "industrial" to broader terms such as "production" or "systems", leading to the typical extensions noted above. In fact, the primary U.S. professional organization for Industrial Engineers, the Institute of Industrial Engineers (IIE) has been considering changing its name to something broader (such as the Institute of Industrial & Systems Engineers), although the latest vote among membership deemed this unnecessary for the time being.

**Concept of Industrial Engineering**

 Industrial engineering is a branch of engineering dealing with the optimization of complex processes or systems. It is concerned with the development, improvement, implementation and evaluation of integrated systems of people, money, knowledge, information, equipment, energy, materials, analysis and synthesis, as well as the mathematical, physical and social sciences together with the principles and methods of engineering design to specify, predict, and evaluate the results to be obtained from such systems or processes. Its underlying concepts overlap considerably with certain business-oriented disciplines such as operations management, but the engineering side tends to emphasize extensive mathematical proficiency and usage of quantitative methods.

Or.

Depending on the subspecialties involved, industrial engineering may also be known as, or overlap with, operations management, management science, operations research, systems engineering, manufacturing engineering, ergonomics or human factors engineering, safety engineering, or others, depending on the viewpoint or motives of the user. For example, in health care, the engineers known as health management engineers or health systems engineers are, in essence, industrial engineers by another name.

**Importance of Industrial Engineering**

Industrial engineering is a type of engineering. It is one of the fastest growing areas of engineering. It looks at what makes organizations work best. An industrial engineer tries to find the right combination of human and natural resources, technology, equipment, information and finance to do the work best. Industrial engineering is important to finding the answers to many important problems in manufacturing, distribution of goods and services, health care, utilities, transportation, entertainment, and the environment. Industrial engineers design and change how things are done to increase quality, safety and productivity. Accordingly, the industrial engineering are very important to the companies according to the following reasons;

**1**. Industrial engineering has provided a systematic approach to streamline and improve productivity and efficiency in the business world.

**2.** The most distinctive aspect of industrial engineering is the flexibility that it offers. Whether it’s shortening a rollercoaster line, streamlining an operating room, distributing products worldwide, or manufacturing superior automobiles, all share the common goal of saving money and increasing efficiencies.

**3.** Industrial engineers are the only engineering professionals trained as productivity and quality improvement specialists.

**4.** Industrial engineers figure out ways to do things better. They engineer processes and systems that improve quality and productivity. They work to eliminate waste of time, money, materials, energy, and other commodities. Most important of all, IE’s save companies money. This is why more and more companies are hiring industrial engineers and then promoting them into management positions.

**5.** The industrial does not mean just manufacturing. It encompasses service industries as well. It has long been known that industrial engineers have the technical training to make improvements in a manufacturing setting. Now it is becoming increasingly recognized that these same techniques can be used to evaluate and improve productivity and quality in service industries**.**

**IEs Work in Many Types of Industries**

* Aerospace & Airplanes
* Aluminum & Steel
* Banking
* Ceramics
* Construction
* Consulting
* Electronics Assembly
* Energy
* Entertainment
* Forestry & Logging
* Insurance
* Materials Testing
* Medical Services
* Military
* Mining
* Oil & Gas
* Plastics & Forming
* Retail
* Shipbuilding
* State & Federal Government
* Transportation

**Some Techniques Utilized by IEs**

* Benchmarking
* Design of Experiments
* Employee Involvement
* Equipment Utilization
* Flow Diagramming
* Information & Data Flow
* Diagramming
* Interviewing for Information
* Lean Manufacturing
* Modeling & Testing
* Operations Auditing
* Organizational Analysis
* Pilot Programs
* Plant & Equipment Layout
* Project Management
* Simulation
* Six Sigma projects
* Statistical Analysis
* Strategic Planning
* Theory of Constraints
* Time Studies
* Work Sampling

