## **NDSE 120: Introduction to Industrial Engineering (3 credits)**

This course is an introduction and orientation to industrial engineering. Topics surveyed include concepts and approaches, illustrations of main methods and applications presented by a series of lectures given by the NDSE faculty. The course also involves an overview of departmental laboratories, basic information technologies, and software including mathematical packages and Web-based applications.

***Prerequisites:*** *None*

**Course Learning Outcomes:**

By the end of the course, students will be able to:

A1. Demonstrate the overall Industrial Engineering Body of Knowledge (IEBOK) through identification of its main domains,

and their applications.

A2 Develop critical thinking and problem-solving skills through

analysis of assigned questions, exercises, problems, and cases

Studies.

A3 Develop scientific and methodological approach of productivity improvement project through presenting real world case studies in the field of industrial engineering.

B1. Demonstrate effective use of tools and techniques in the industrial engineering.

B2. Analyze organizational wastes and identify potential solutions with determine the appropriate tools and techniques of industrial engineering.

C1. Develop a productivity improvement mindset through researching organizational wastes, and being able to define them, understand their causes, determine where at real workplace they exist, and how these wastes could be eliminated or reduced with practical solutions and finally identifying case studies about these wastes.

C2: Work as a member of a team to tackle a domain of industrial engineering.

**Course Learning Materials:**

* The Lean Toolbox, 5th edition. A handbook for lean transformation, by John Bicheno and Matthias Holweg

**Course Content:**

1. Industrial Engineering Body of Knowledge.
2. Introduction to the Institute of Industrial and System Engineers
3. Productivity Improvement Concept and Applications
4. Kaizen Concept and Applications
5. Operations Research Analysis,
6. Engineering Economic Analysis,
7. Facilities Engineering and Energy
8. Management, Quality and Reliability Engineering,
9. Ergonomics and Human Factors,
10. Operations Engineering and Management,
11. Supply Chain Management,
12. Engineering Management,
13. Design and Manufacturing
14. Engineering, and Product Design and Development
15. Safety
16. Six Sigma and Cost Optimization Concept and Applications
17. Management Systems (Quality + Safety + Environment) Concept and Applications
18. Work Design and Measurement,