Addis Ababa Institute of Technology (AAiT)

School of Mechanical and Industrial Engineering

Plant Design and Erection (MEng 6105)

Gulelat Gatew (PhD)

Course Objective

The student will have a through understanding of

- 1. The fundamentals of manufacturing and production economics.
- 2. Plant location and design.
- 3. Design and analysis of warehouses.
- 4. Industrial Vehicles as materials handling.
- 5. Technology selection, erecting and Commissioning.

Course outline

I. FUNDAMENTALS OF MANUFACTURING

- Manufacturing Industries
- Types of Production
- Functions of Manufacturing
- Organisation and information Processing in Manufacturing

II PRODUCTION ECONOMICS

- Methods of Evaluating Investment Alternatives
- Cost in Manufacturing
- Break-even Analysis
- Unit cost of production

III. PLANT DESIGN

- General
- Product Design
- Plant Location
- Plant Layout

IV. MATERIAL STORAGE

- Existing and new warehouse systems
- Automated high rise rack system
- Warehouse design
- Containers
- Packaging

V. INDUSTRIAL VEHICLES

- Forklift
- AGV
- AS/RS
- Carousel Systems

VI. LAYOUT PLANNING MODELS

- Construction Procedure
- Improvement Procedure
- Computerized Relative Allocation of Facility Technique(CRAFT)
- COmputerized RElationship LAyout Planning (CORELAP)
- ALDEP Procedure

VII. PLANT ERECTION AND COMMISSIONING

Course requirement

- 1. Reading assignments on each topic from different sources.
- 2. Each student is required to work on a semester long exercise in plant design and submit the report with all the drawings.
- 3. Final exam (50%)

REFERENCE MATERIALS

- 1. Daniel Kitaw "Industrial Management and Engineering Economy: An Introduction to Industrial Engineering" Text Book, Addis Ababa University Press, 2009.
- 2. S.C. Sharma, "Plant Layout and Materials handling", Khanna publishers, 2003.
- 3. Daniel Kitaw, "Materials Handling Equipment", Addis Ababa University, 2001.
- 4. Rudenko, "Materials Handling Equipment", Peace publisher, Moscow
- 5. Richard Muther, "Practical Plant Layout", McGraw-Hill Book Company Inc. 1955.
- 6. Tompkins et al, "Facilities Planning", 3rd edition, John Wiley & sons, Singaphore, 2003.
- 7. M. P Grover, "Automation, Production Systems and Computer Integrated manufacturing", Prentice Hall international, 1987.