Addis Ababa University
Addis Ababa Institute of Technology
School of Mechanical and Industrial Engineering
Production and Operations Management –POM-(ME 66422)
Manufacturing Stream, Credit Hours: 3; ESTC: 7; Contact Hours: 3 Lecture
By Kassu Jilcha (PhD), Academic Year 2019/20

Learning Outcome:

On successful completion of this module students would be able to:

➢ Demonstrate an understanding of production as a process of converting or transforming resources into products;
➢ Demonstrate an understanding of the manager's concern in planning, organizing, directing, and controlling productive operations to meet organizational objectives;
➢ Demonstrate an understanding of productivity measures, quality and costs both, direct and indirect; and
➢ Use a variety of problem-solving techniques to aid in effective decision making.

CONTENT:

Chapter One

1. **Introduction: Operations Planning Concepts:**
   1.1. Introduction,
   1.2. Operations Functions in Organizations,
   1.3. Historical development,
   1.4. Framework for managing   operations, the trend: Information and Non-manufacturing   systems, Operations management,
   1.5. Factors affecting productivity and International dimensions of productivity,
   1.6. The environment of operations, and Production systems decisions-a look ahead.

2. **OPERATIONS DECISION MAKING:**
   2.1. Introduction,
   2.2. Management as science,
   2.3. Characteristics of decisions,
   2.4. Framework for decision making,
   2.5. Decision methodology,
   2.6. Decision Tree System Design and Capacity:
      2.6.1. Introduction,
      2.6.2. Manufacturing and service systems, Design problems,
      2.6.3. Economic models-Break Analysis in operations, /V ratio, Statistical models

3. **FORECASTINGDEMAND:**
   3.1. Forecasting objectives and uses,
   3.2. Forecasting variables,
   3.3. Opinion and judgmental methods,
   3.4. Time series methods,
      3.4.1. Moving average methods,
      3.4.2. Exponential smoothing techniques,
      3.4.3. Trend adjusted exponential smoothing,
      3.4.4. Regression and correlation methods,
      3.4.5. Application and control of forecast, MEAN, absolute deviation, BIAS, Tracking signal

4. **Aggregate planning and master scheduling:**
   4.1. Introduction
   4.2. Planning and Scheduling,
   4.3. Objectives of Aggregate Planning,
   4.4. Three Pure strategies
   4.5. Aggregate Planning Methods,
   4.6. Master scheduling Objectives,
   4.7. Master Scheduling Methods

5. **Material and Capacity Requirements Planning:**
   5.1. Overview
   5.2. MRP and CRP,
   5.3. MRP:
   5.3.1.   Underlying concepts,
   5.3.2.   System parameters,
   5.3.3.   MRP logic,
   5.3.4.   System refinements,
   5.3.5.   Capacity management,
   5.3.6.   CRP activities

6. Scheduling and Control of Production Activities:

6.1. Introduction to PAC objective and data requirement,

6.2. Loading –Finite and Infinite scheduling methodology,

6.3. Priority sequencing, capacity control,

6.4. Single Machine Loading:

   6.4.1. Concept and   measure of performance,

   6.4.2. SPT rule,

   6.4.3. Weighted SPT rule,

   6.4.4. EDD rule

6.5. Flow **Shop Scheduling:**

   6.5.1. Introduction,

   6.5.2. Johnson's rule for 'n' jobs on 2 and 3 machines,

   6.5.3. CDS heuristic

6.6. **Job Shop Scheduling:**

   6.6.1. Types of schedules,

   6.6.2. Heuristic procedure and scheduling 2 jobson 'm' machines

Teaching Strategy/Methods:

- ➢ Lecture
- ➢ Workshops and Laboratories
- ➢ Projects

Assessment Strategy:

- ➢ **Exercises and assignment --20%**
- ➢ **Article review and practice of software's-----------------------------------10%**
- ➢ **Project --25%**
- ➢ **Final examination---45%**

Respective Role of Instructors and Students:

Teaching Support and Inputs:

- ➢ Lectures
- ➢ Workshop and laboratory exercises
- ➢ Project
- ➢ Semester project work

Module Requirements:

- ➢ Minimum of 75% attendance during lecture hours
- ➢ 100%   attendance   during   practical work   sessions, except   for   some   unprecedented mishaps
- ➢ All exercises and project works must be submitted by the specified dead line

Text books: Text Books:

1. Monks, J.G., Operations Management, McGraw-Hill International Editions, 1987.
2. Productions & operations management by Adam & Ebert.
3. Pannerselvam. R., Production and Operations Management, PHI. ChaseJacobs   Aquilano,   Operations   Management   for   Competitive advantages, 10thEdition, TMH

References:

1. Buffa, Modern Production/Operations Management, Wiely Eastern Ltd.
2. Chary, S.N., Production and Operations Management, Tata-McGraw Hill. Operations management by James Dilworth.
3. Lee J Karjewski and Larry P Ritzman, Operations Management – strategy and Analysis,
1. 6th Edn, Pearson Education Asia
4. B J Ranganath , System Dynamics by - I K International Publishing house Pvt. Ltd
2. Production and Operations Management, William J Stevenson, 9th Ed., Tata McGrawHill. 45%