

Chapter Three

Introduction

3-1: Operations Research (OR)

Operation research is an interdisciplinary branch of applied mathematics and formal science that uses methods like mathematical modeling, statistics, and algorithms to arrive at optimal or near optimal solutions to complex problems.

Typical objective functions are:

- ✓ *profit*
- ✓ *assembly line performance*
- ✓ *crop yield*
- ✓ *bandwidth*
- ✓ *loss*
- ✓ *waiting time in queue*
- ✓ *risk*

3-2: Some of the primary tools used in OR are:

- Statistics
- Optimization
- Probability theory
- Queuing theory
- Game theory
- Graph theory
- Decision analysis
- Simulation

3-3: How OR works:

- 1-** Definition of the problem.
- 2-** Construction of the model.
- 3-** Solving of the model.
- 4-** Testing the model and solving derived from it.
- 5-** Implementation and control the model.

3-4: The structure of mathematical model:

Mathematical model includes three basic sets of element:

- 1-** Objective function.
- 2-** Constraints or restriction.
- 3-** Decision variables and parameters.