Modeling & Simulation

Dr. Laila abdel hamid
Laila.m.abdelhamid@gmail.com

Teams Code:
p111hap

Textbook

***Quantitative Analysis for Management*, *Eleventh Edition*,**

by Render, Stair, and Hanna

Learning Objectives

After completing this course, students will be able to:

1. **Scope is business oriented with the knowledge of popular simulation techniques.**
2. **Tackle a wide variety of problems by simulation.**
3. **Understand the seven steps of conducting a simulation.**
4. **Explain the advantages and disadvantages of simulation.**
5. **Understand alternative Methods for simulation packages available.**

Assessment

Assessment	Weight
Midterm	30%
Section	10%
Final Exam	60%

- **Bonus**

Problem solving

- People have been using mathematical tools to help solve problems for thousands of years.
- In this course we study the *application of quantitative techniques* to practical decision making.
- The techniques we study in have been applied successfully to of complex problems in *business, government, health care, education, and many other areas*

What is Quantitative Analysis?

- Quantitative analysis is the process of collecting and evaluating measurable and verifiable data such as revenues, market share, and wages in *order to understand the behavior and performance of a business.*
- In the past, business owners and company directors relied heavily on their experience and instinct when making decisions.

In other words

- Quantitative analysis is used to support the managerial decision-making process
- With data technology, quantitative analysis is now considered a better approach to make informed decisions.

What is Operations Research

- OR and QM feature the same algorithms and techniques. However, engineering and science degrees prefer to use the word Operations Research while business programs employ Quantitative Methods, Quantitative Management, and Quantitative Techniques in Business

FYI, reading

- Quantitative analysis or quantitative techniques can apply to any measurement-based, numerical methods for investigating areas of science.
- Operations research science is a related, yet somewhat different field. It involves the use of mathematical techniques, such as statistical analysis, to assist in making decisions. *Making decisions differs from investigating scientific topics.*

Scope of Simulation

- Constructing a telecommunications network at low cost while still guaranteeing Quality of Service (QoS) or Quality of experience (QoE) if particular connections become very busy or get damaged.
- Designing the layout of a computer chip to reduce manufacturing time (therefore reducing cost)
- Robotizing or automating human-driven operation processes.
- Network data traffic: these are known as queuing models or queuing systems
- Road traffic management and 'one way' street allocations i.e. Allocation problem
- simulation of patient flow in emergency rooms to simulation of populations with a specific chronic diseases.