# 2 Lecture - CS304

# **Important Subjective**

# 1. What is a model and why are models useful?

Answer: A model is a simplified representation of a complex system or phenomenon that helps us to understand and make predictions about it. Models are useful because they allow us to test hypotheses, simulate real-world phenomena, and inform decision-making.

# What are the different types of models?

Answer: There are various types of models, including physical models, mathematical models, computer models, conceptual models, and statistical models.

#### How are models used in science?

Answer: Models are used in science to study and simulate real-world phenomena, test hypotheses, and make predictions about how systems will behave under different conditions.

# What are some limitations of using models?

Answer: Models may make assumptions and simplifications that can affect their accuracy, and they can never perfectly capture the complexity of reality.

# How can models be validated and tested?

Answer: Models can be validated and tested by comparing their predictions to real-world data, testing different scenarios and assumptions, and using sensitivity analysis to determine how the model responds to changes in input parameters.

## What is the role of models in decision-making?

Answer: Models can inform decision-making by providing insights into the likely outcomes of different scenarios and by identifying the key factors that influence the system being studied.

# What are some challenges in developing accurate models?

Answer: Developing accurate models can be challenging due to the complexity of real-world systems, the difficulty in obtaining accurate data, and the need to make assumptions and simplifications that may affect the model's accuracy.

## How are mathematical models used in science and engineering?

Answer: Mathematical models are widely used in science and engineering to describe the behavior of physical systems, predict the outcomes of experiments, and optimize system performance.

## What is the difference between a physical model and a computer model?

Answer: A physical model is a physical replica of a real-world system, while a computer model is a mathematical or computational representation of a system that is run on a computer.

## How do models contribute to scientific understanding?

Answer: Models contribute to scientific understanding by allowing scientists to test hypotheses, simulate the behavior of real-world systems, and make predictions about how systems will

| behave under different conditions. They also help identify gaps in our understanding and guide future research. |  |
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