

# 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.