

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.