# SYSTEM SIMULATION AND MODELLING

LECTURE 3

Section A

TOPIC COVERED :Types of Models, Discrete Event System Simulation

MODELS

O Models are representations and, therefore, their depictions and specifications can take many forms. Probably the most convenient way to represent a system is by using a textual description.

O **1.** based on the state of the system as it evolves over time;

O **2.** focused on the stochastic nature of the model;

O **3.** representative of the dynamic, physics-based processes of the system;

O **4.** described according to the systems' multidomain or multielement makeup; or

O **5.** composed of a hybrid of more than one of these modeling flavors.

TYPES OF SYSTEM MODEL
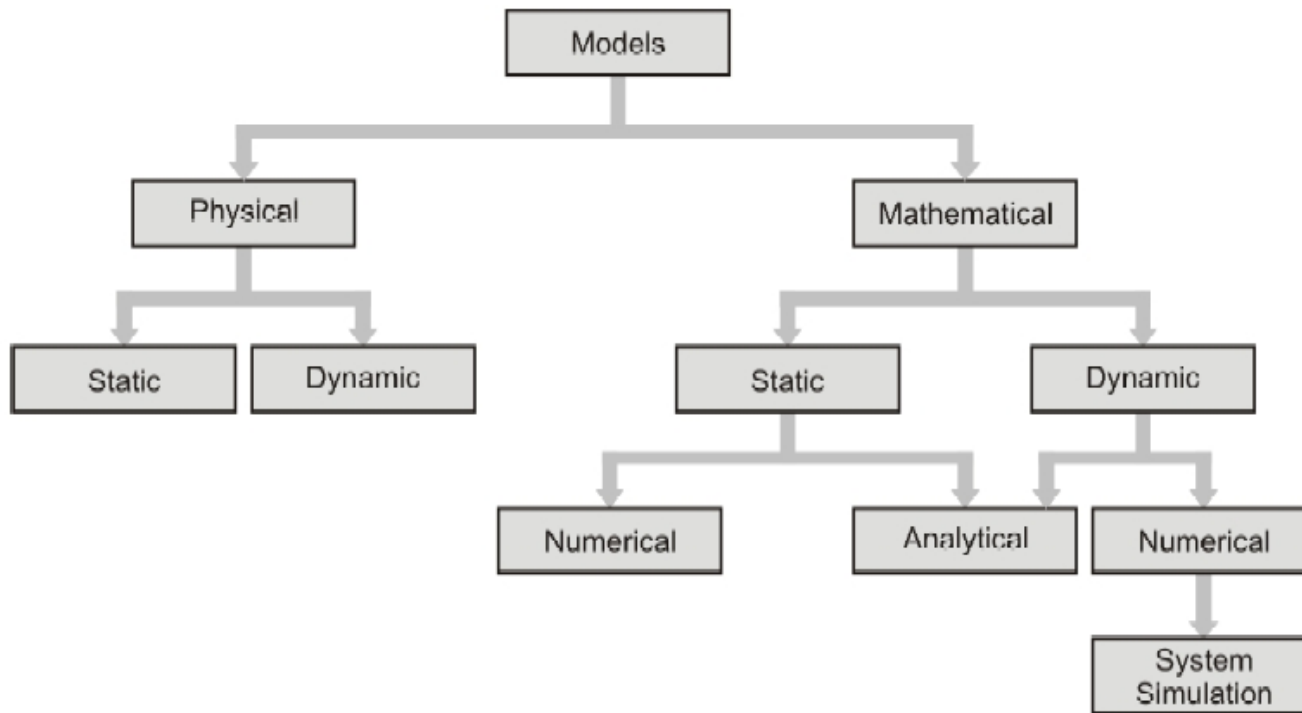
CONCEPTS IN DISCRETE EVENT SIMULATION

The concepts of discrete event simulation is described as follows:

O **Model:** An abstract representation of a system, usually containing structural, logical or mathematical relationships that describe a system in terms of state, entities and their attributes, sets, processes,events, delays and activities.

System: A collection of entities that interact together over time to accomplish one or more goals.

System state: A collection of variable that contain all the information necessary to describe the system at any time.

Entity: Any object or component in the system that requires explicit representation in the model (e.g. a customers a server, a machine).

Attributes: The properties of a given entity is called *attributes*.

Event: An instantaneous occurrence that changes the state of a system.

o **List:** A collection of associated entities, ordered in some logical fashion.

o **Activity:** A duration of time of specified length which is known when it begins.

o **Delay:** A duration of time of unspecified indefinite length which is not known until it ends.

o **Clock:** A variable representing simulated time is called *clock*.