SYSTEM SIMULATION AND MODELLING

LECTURE 2

Section C

TOPIC COVERED: Characteristics of Queuing systems,

Introduction to Queuing System

- **The combination of all entities in the system, those being served and those waiting for service will be called queue.**
- Congestion may be described in terms of three main characteristics. These are as follows:

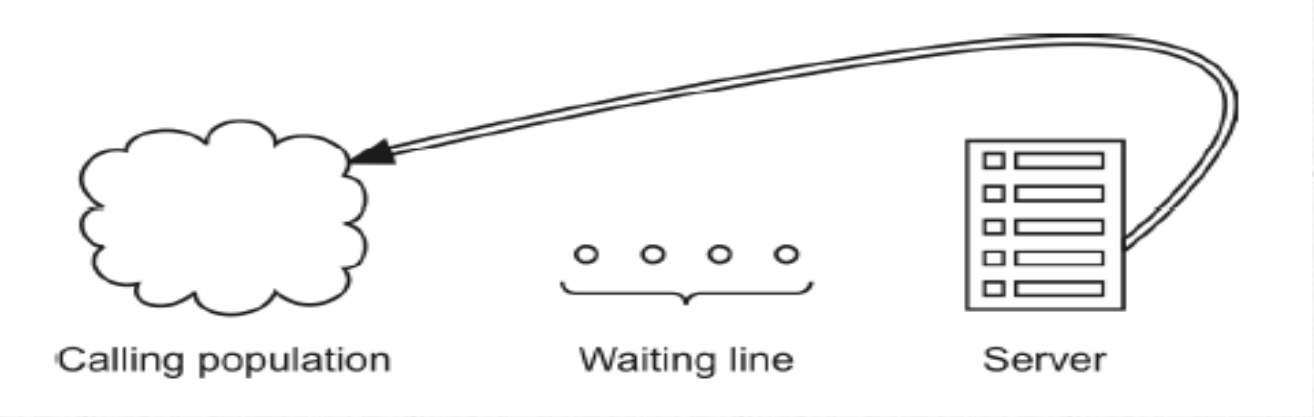
  (I) Arrival pattern

  (II) Service process

  (III) Queueing discipline
- **Arrival pattern:** Arrival pattern describes the statistical properties of the arrivals.
- **Serving process:** Serving process describes how the entities are served.
- **Queueing discipline:** Queueing discipline describes how the next entity to be served is selected.

QUEUEING SYSTEMS

A queuing system is described by its calling population, the nature of the arrivals, the service mechanism, the system capacity and the queueing discipline. A simple single channel queuing system is shown in Fig



- The key elements of a queueing system are the customers and servers. The term “customer” refers to any type of entity that can be viewed as requesting “service” from a system.
- The term “server” might refer to receptionists, mechanics, tool crib clerks, repair persons, medical personnel, automatic storage and retrieval machines (e.g., cranes), CPU in a computer or any resource that provides the requested service.
- Therefore, many service facilities, production systems, repair and maintenance facilities, communications and computer systems, and transport systems can be viewed as a queueing system.

- **List:** A collection of associated entities, ordered in some logical fashion.
- **Activity:** A duration of time of specified length which is known when it begins.
- **Delay:** A duration of time of unspecified indefinite length which is not known until it ends.
- **Clock:** A variable representing simulated time is called *clock*.