**Course: Advanced Bioinformatics**

**Module title: Data Modeling**

**Module no. : 12**

In this module we will discuss following two things for Data Model.

1. What is Data Model
2. Levels of Data Model

**Data Model:** There are several concepts related to data model.

* It is a Subset of reality
* Universe of discourse
* Real World
* Universe of modeled phenomena

**Data Model - Definition**

1. Formal representation of something that needs to be understood, remembered, communicated, tested

Represents how users reality is organized in terms of objects, properties, relationships, and processes.

1. Collection of concepts that describe the structure of database.

**Collection of tools for describing:**

* Data
* Data relationships
* Data constraints
* Data semantics

**Levels of Data Model:**

* Conceptual Data Model
* Logical Data Model
* Physical Data Model

1. **Conceptual Data Model**

· Users perception of the real world

· Defines highest level relationship between different entities.

· Includes high level constructs or entities.

· No attributes.

· Highly abstract in nature.

· Describes what system contains

1. **Logical Data Model**

* A formal description of data model
* Fully attributed data model that is independent of DBMS, storage and technology.
* Includes entities (tables), attributes (columns/fields) and relationships (keys).
* Describes how system will be implemented regardless of DBMS

1. **Physical Data Model**

· Physical storage of the data (format, order, path)

· Fully attributed data model that is dependent on DBMS technology.

· How the system will be implemented by DBMS.

· Includes tables, columns, keys, data types, validation rules, and

access constraints.