

## Quadrant II – Transcript and Related Materials

**Programme: Bachelor of Science (First Year)**

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**Paper Code: ZOC 101**

**Paper Title: Diversity of Non- Chordates & Cell Biology**

**Unit: 7**

**Module Name: Classification up to classes of phylum Arthropoda (part 2)**

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### **NOTES:**

Arthropoda is a phylum of invertebrate animals that includes insects, spiders, crustaceans, and other related groups. They are characterized by their jointed limbs, segmented bodies, and exoskeletons made of chitin. Arthropods are found in every habitat on Earth, and they play important roles in ecosystems as predators, scavengers, and pollinators. Arthropods are the largest group of animals, with over one million described species. They exhibit an incredible diversity of forms and lifestyles, ranging from tiny parasitic mites to enormous crustaceans such as the Japanese spider crab, which can have a leg span of up to 3.8 meters. Arthropods have also been incredibly successful in adapting to a wide range of environmental conditions, including deserts, deep oceans, and polar regions. While arthropods are generally considered beneficial, some species can be pests, spreading disease or causing damage to crops and property.

### **CLASSIFICATION OF PHYLUM ARTHROPODA**

Arthropods are classified into several subphyla based on their morphological characteristics and evolutionary relationships.

The following are the main subphyla of Arthropoda, according to the classification given by Vandel, 1949; Snodgrass, 1960 and Storer, 1979:

- **SUBPHYLUM TRILOBITOMORPHA** - This subphylum includes extinct arthropods with one living fossil, *Limulus*. They had a distinctive three-lobed body plan and a hard exoskeleton.

- **SUBPHYLUM CHELICERATA** - This subphylum includes spiders, scorpions, ticks, and mites. They have two main body parts (cephalothorax and abdomen), six pairs of appendages (including chelicerae and pedipalps), and no antennae.
- **SUBPHYLUM MANDIBULATA** - Mandibulata is a subphylum of arthropods that includes insects, crustaceans, and myriapods. The name "mandibulata" refers to the presence of mandibles or jaws in these organisms, which are used for biting and chewing food. Members of Mandibulata have a segmented body, a hardened exoskeleton, jointed appendages, and a well-developed nervous system. They also have complex mouthparts and well-developed sensory organs, including compound eyes and antennae.

Subphylum Mandibulata includes 06 classes – Class Crustacea, Class Chilopoda, Class Symphyla, Class Pauropoda, Class Diplopoda and Class Insecta.

1. **CLASS CRUSTACEA** - This class includes animals such as crabs, lobsters, shrimp, and barnacles and other aquatic arthropods. Crustaceans have a hard exoskeleton and jointed appendages and they breathe through gills. They have two main body parts (head and thorax fused into a cephalothorax, and abdomen), two pairs of antennae and various number of appendages for swimming, walking, and feeding. Their mouthparts are adapted for feeding on a wide range of foods.
2. **CLASS CHILOPODA** – This class includes the centipedes. Centipedes are elongated, segmented arthropods with many pairs of legs. They are found all over the world and most species are predators. Centipedes are characterized by their elongated body, which is divided into numerous segments, with each segment bearing one pair of legs. The first segment of the body is modified into a pair of venomous claws, which are used to capture and subdue prey. Centipedes have a pair of antennae and a pair of mandibles for feeding. They also have a pair of maxillae, which are modified legs that help in manipulating and chewing food. Centipedes are generally nocturnal and can be found in a variety of habitats, including deserts, forests, and wetlands. They are often considered pests because some species can bite humans, causing pain and swelling. However, most species of centipedes are harmless and play an important role in controlling the populations of other insects and small animals.
3. **CLASS SYMPHYLA** - Symphyla is a class of small, soil-dwelling arthropods that belong to the subphylum Mandibulata. They are sometimes referred to as "pseudocentipedes" because they resemble centipedes in their elongated body shape and numerous leg-like appendages, but they are not true centipedes. Symphylans have a cylindrical, segmented body with 12 to 24 pairs of short, stumpy legs. They range in size from less than 1mm to 20mm in length. They lack eyes and have poor vision, but they have an array of sensory setae that help them to navigate their environment. Symphylans are

found in moist soils around the world, where they feed on organic matter and rootlets. Some species are considered pests of agricultural crops because they can damage plant roots and reduce yields. However, most symphylans are harmless and play important roles in soil ecosystems, where they help to break down organic matter and facilitate nutrient cycling.

4. **CLASS PAUROPODA** - Pauropoda is a class of tiny, soil-dwelling arthropods that belong to the subphylum Mandibulata. They are typically less than 1 mm long and have a segmented body with 11 to 20 pairs of short legs. Pauropods have a small, round head with a pair of antennae and a pair of mandibles for feeding. Pauropods are found in moist soils around the world, where they feed on fungi, bacteria, and other organic matter. They play an important role in soil ecosystems, where they help to break down dead plant material and facilitate nutrient cycling. Pauropods are generally not well-studied, and many aspects of their biology and behavior are still poorly understood. However, they are known to be sensitive to changes in soil moisture and temperature, and they may be useful as indicators of soil health and ecosystem function.
5. **CLASS DIPLOPODA** - Diplopoda is a class of arthropods that belong to the subphylum Mandibulata. They are commonly known as millipedes, although they do not actually have a thousand legs. Millipedes have a long, cylindrical body made up of numerous segments, each of which has two pairs of jointed legs. Most species of millipedes have between 30 and 400 legs, depending on the number of body segments. Millipedes are found in a wide range of habitats, including forests, grasslands, deserts, and caves. They are primarily detritivores, feeding on decaying organic matter and helping to break down dead plant material. Some species of millipedes are also known to feed on live plants, although they are generally not considered to be serious pests. Millipedes have a hard exoskeleton and are often brightly colored, with patterns and markings that serve as a warning to potential predators. They are generally slow-moving and tend to curl up into a ball when threatened, using their hard exoskeleton as a form of armor.
6. **CLASS INSECTA** - This is the largest class in the animal kingdom, with over a million described species, making up over 80% of all known animal species. Insects are characterized by their three-part body (head, thorax, and abdomen), six legs, two pairs of wings (in most species), and various types of mouthparts that are adapted to their specific diets. Insects have a diverse range of ecological roles, including pollination, decomposition, and pest control. Insects are the most diverse group within Mandibulata, with over a million known species.