FACULTY OF LIFE SCIENCES

Syllabus for the

Subject: Zoology

For the award of the Degree in

Bachelor of Science (Medical) (Honours)

(Offered under 4- year UG Degree Programme)

(Credit Based Continuous Evaluation Grading System under NEP 2020)

(SEMESTER: I-II)

Session: 2026-27

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

The Heritage Institution

KANYA MAHAVIDYALAYA, JALANDHAR (AUTONOMOUS)

SCHEME AND CURRICULUM OF EXAMINATION OF FOUR YEAR UNDER

GRADUATE DEGREE PROGRAMME

Session-2026-27

Bachelor of Science (Medical) (Honours) Semester -I										
Course Name	**Paper**	**Course Code**	**Course Type**	**Credits L-T-P**	**Hours per week L-T-P**	**Total Marks**	**Marks**			**Exam Time in Hrs**
							L	**P**	**CA**	
Zoology	Diversity of Nonchordates-I (Protozoa - Annelida)	BSML-1483	DSC	4-0-0	4-0-0	100	70	-	30	3
	Nonchordates-I Lab	BSMP-1483	DSC	0-0-2	0-0-4	50	-	35	15	3
Bachelor of Science (Medical) (Honours) Semester -II										
Zoology	Diversity of Nonchordates-II (Arthropoda - Hemichordata)	BSML-2483	DSC	4-0-0	4-0-0	100	70	-	30	3
	Nonchordates-II Lab	BSMP-2483	DSC	0-0-2	0-0-4	50	-	35	15	3

Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)
Course Title: Zoology (Diversity of Nonchordates- I (Protozoa - Annelida))
Course Code: BSML-1483
(THEORY)

Course Outcome

After passing this course the student will be able to:

- CO1: Gain knowledge about physiology of unicellular life and parasitic protozoan.
- CO2: Understand the important marine water non chordates.
- CO3: Learn about parasitic Platyhelminthes
- CO4: Understand the economic importance and physiology of Ascaris and earthworm

Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)

Course Title: Zoology (Diversity of Nonchordates- I (Protozoa - Annelida))

Course Code: BSML-1483

(THEORY)

Credits: 4-0-0 **Max Marks: 100**

Time: 3 Hours **Theory: 70**

CA: 30

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question will carry 14 marks.

Detailed Type study of the following animals

UNIT-I

Protozoa: *Amoeba proteus*
Paramecium caudatum (with special reference to Kappa particles in *P. aurelia*)
Plasmodium vivax
Introduction to parasitic protozoans

UNIT-II

Parazoa (Porifera): *Sycon*,
Cnidaria (Coelentrata): *Obelia*

UNIT-III

Platyhelminthes: *Fasciola hepatica*,
Taenia solium
Larvae of *Fasciola hepatica* and *Taenia solium*
Role of Artificial Intelligence in Identification of parasites

UNIT-IV

Aschelminthes: *Ascaris*, Parasitic adaptations in Helminthes
Annelida: *Pheretima posthuma* (Earthworm)

Suggested Readings:

1. Dhami, P.S. &Dhami, J. K(2001), Invertebrates, R. Chand & Co., New Delhi.
2. Brusca, R. C. and Brusca, G. J. (2003), Invertebrates (2nd ed). Sinauer Associates, Inc. Publishers, Sunderland, Massachusetts.
3. Engemann, J. G. and Hegner, R. W. (1981), Invertebrate Zoology (3rd ed.) Macmillan, New York.
4. Gardiner, M. S. (1972), The Biology of Invertebrates, McGraw Hill, New York.
5. Meglitsch, P. A. and Schran, F. R. (1991), Invertebrate Zoology (3rd ed). Oxford University Press, New York.
6. Pechenik, A. Jan. (2000), Biology of the invertebrates, (4th ed), McGraw Hill Book Co. Singapore.

Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)
Course Title: Zoology (Nonchordates- I Lab)
Course Code: BSMP-1483
(PRACTICAL)

Course Outcome

After passing this course the student will be able to:

- CO1. Familiarise with Scientific method
- CO2. Recognize and identify the taxonomic diversity of representative non-chordates.
- CO3. Demonstrate competency in basic zoological laboratory techniques, including temporary slide preparation, specimen observation, and microscopic identification.
- CO4. Understand functional anatomy of the digestive, reproductive, and nervous systems of *Pheretima*

Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)
Course Title: Zoology (Nonchordates- I Lab)
Course Code: BSMP-1483
(PRACTICAL)

Credits: 0-0-2 **Max Marks: 50**
Time: 3 Hours **Practical: 35**
CA: 15

Instructions for the Practical Examiners: Question paper is to set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar

Guidelines for conduct of practical Examination: -

1. Identify and classify the specimens upto order level. Write a note on their habit, habitat, special features and economic importance. 8
2. Identify the slides/micrographs and give two reasons for identification. 5
3. Make a temporary mount of protozoa. 5
4. Draw a well labelled sketch of the given system of the organism and explain to the examiner. 5
5. Report 6
6. Viva-voce & Practical file. 6

1. Classification up to order level with ecological notes and economic importance (if any) of the following animals (Through Specimens or slides):

A. Protozoa: *Amoeba, Euglena, Trypanosoma, Noctiluca, Eimeria, Monocystis, Paramecium Opalina, Vorticella, Balantidium, Nyctotherus* and *Polystomella.*

B. Porifera: *Sycon, Grantia, Euplectella, Hyalonema, Spongilla, Euspongia.*

C. Cnidaria: *Porpita, Velella, Physalia, Aurelia, Rhizostoma, Metridium, Millipora, Alcyonium, Tubipora, Zoanthus, Madrepora, Favia, Fungia and Astrangia.*

Hydra (W.M.), *Hydra* with buds, *Obelia* (colony and medusa), *Sertularia, Plumularia, Tubularia, Bougainvillea* and *Aurelia*

D. Platyhelminthes: *Dugesia, Fasciola, Taenia, Echinococcus.*

Miracidium, Sporocyst, Redia, Cercaria of *Fasciola,* scolex and proglottids of *Taenia* (mature and gravid).

E. Aschelminthes: *Ascaris* (male and female), *Trichinella, Ancylostoma.*

F. Annelida: *Pheretima, Nereis, Heteronereis, Polynoe, Eunice, Aphrodite, Chaetopterus, Arenicola, Tubifex* and *Pontobdela*

2. **Study of the following permanent stained preparations**:

A. L.S. and T.S. *Sycon,* gemmules, spicules and spongin fibers of a sponge.

B. T.S. *Hydra* (Testis and ovary region)

C. T.S. *Fasciola* (Different regions)

D. T.S. *Ascaris* (Male and Female)

E. T.S. *Pheretima* (pharyngeal and typhlosolar regions), Setae, septal nephridia, spermathecae and ovary of *Pheretima* (Earthworm).

3. **Preparation of the following slides**:

Temporary preparation of freshwater Protozoan culture.

4. Demonstration of digestive, reproductive and nervous systems of earthworm with the help of charts/videos/models.

Note:- Some changes can be made in the practical depending on the availability of material.

Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)
Course Title: Zoology (Diversity of Nonchordates- II (Arthropoda - Hemichordata))
Course Code: BSML-2483
(THEORY)

Course Outcomes:

After passing this course the student will be able to:

CO1. Understand physiology and economic importance of cockroach and social organization of insects.

CO2. Gain knowledge about the general pattern of life history of phylum mollusca

CO3. Learn about life history and larval forms of Echinodermata

CO4. Gain knowledge about affinities of Hemichordates with Non-Chordates and Chordates

Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)

Course Title: Zoology (Diversity of Nonchordates- II (Arthropoda - Hemichordata))

Course Code: BSML-2483

(THEORY)

Credits: 4-0-0 **Max Marks: 100**

Time: 3 Hours **Theory: 70**

CA: 30

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question will carry 14 marks.

UNIT-I

Arthropoda: Type study- *Periplaneta americana* (Cockroach),

Social organizations in insects (Honey bee and Termite)

UNIT-II

Mollusca: Type study-Pila globosa, Tortion, Pearl formation

UNIT-III

Echinodermata: Type study - Asterias (Star fish), Study of Echinoderm larvae

UNIT-IV

Hemichordata:Type study - Balanoglossus (External characters only). Affinities of Hemichordates with Non-Chordates and Chordates

Role of Artificial Intelligence in Study of Nonchordates Diveristy

Suggested Readings:

1. Barnes, R.D. (1999), Invertebrate Zoology. W.B. Saunder, Philadelphia.
2. Dhami, P.S. & Dhami, J. K., Invertebrates, R. Chand & Co., New Delhi, 2001.
3. Barth, R. H. and Broshears, R. E (1982), The Invertebrate world. Holt Saunder, Japan.
4. Brusca, R. C. and Brusca, G. J. (2003), Invertebrates (2nd ed), Sinauer Associates, Inc. Publishers, Sunderland, Massachusetts.
5. Engemann, J. G. and Hegner, R. W. (1981), Invertebrate Zoology (3rd ed), Macmillan, New York.
6. Gardiner, M. S. (1972), The Biology of Invertebrates, McGraw Hill, New York.

7. Meglitsch, P. A. and Schran, F. R. (1991), Invertebrate Zoology (3rd ed), Oxford University Press, New York.
8. Pechenik, A. Jan. (2000), Biology of the invertebrates, (4th ed), McGraw Hill Book Co. Singapore.

Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)
Course Title: Zoology (Nonchordates- II Lab)
Course Code: BSMP-2483
(PRACTICAL)

Course Outcomes:

After passing this course the student will be able to:

- CO1. Identify, classify, and differentiate representative specimens of Arthropoda, Mollusca, Echinodermata, and Hemichordata up to the prescribed taxonomic level, highlighting their ecological and economic significance.
- CO2. Examine and interpret permanent stained preparations to understand the structural organization and functional anatomy of selected invertebrates.
- CO3. Analyze the digestive and nervous systems of Periplaneta and relate anatomical adaptations to their functional significance
- CO4. Develop practical skills in specimen identification, microscopic observation, scientific documentation, and preparation of assignments related to invertebrate zoology.

Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)
Course Title: Zoology (Nonchordates- II Lab)
Course Code: BSMP-2483
(PRACTICAL)

Credits: 0-0-2 **Max Marks: 50**
Time: 3 Hours **Practical: 35**
CA: 15

Instructions for the Practical Examiners:

Question paper is to set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar

1. Classification up to order level with ecological notes and economic importance (if any) of the following animals:

Arthropoda: *Peripatus*, *Palaemon* (prawn), Lobster, *Cancer* (crab), *Sacculina*, *Eupagurus* (hermit Crab), Lepas, Balanus, Cyclops, Daphnia, *Lepisma*, *Periplaneta* (cockroach), *Schistocerca* (locust), *Poecilocerus* (ak grasshopper), *Gryllus* (cricket), Mantis (praying mantis), Cicada, *Forficula* (earwig), Dragonfly, Termite queen, Bug, Moth, Beetles, *Polistes* (wasp), *Apis* (honey bee), *Bombyx*, *Pediculus* (body louse) Millipede and Centipede, *Palamnaeus* (scorpion), *Aranea* (spider) and *Limulus* (king Crab).

Mollusca: Anodonta, *Mytilus*, *Ostrea*, Cardium, Pholas, Solen (razor fish), Pecten, *Haliotis*, Patella, *Aplysia*, Doris, Limax, Loligo, Sepia, Octopus, Nautilus shell (Complete and T.S.), Chiton, Dentalium.

Echinodermata: *Asterias, Echinus Ophiothrix, Antedon*.

Hemichordata: *Balanoglossus*.

2. **Study of the following permanent stained preparations:**

Trachea and mouth parts of Insects

Radula and osphradium of *Pila*

T.S. Star fish (Arm).

3. **Demonstration of digestive and nervous systems of *Periplaneta* (cockroach) with the help of charts/models/videos.**

4. **Case Study/Review/Assignment on Ecological and Economic Importance of Invertebrates**

Note: Some changes can be made in the practical depending on the availability of material.

Guidelines for conduct of practical Examination:-

1.	Identify and classify the specimens upto order level. Write a note on their habit, habitat, special features and economic importance.	**10**
2.	Draw a well labelled sketch of the given system of the animal & explain it to the examiner.	**5**
3.	Identify the slides/models and give two reasons for identification.	**5**
4.	Case Study/Review/Assignment	**5**
5.	Viva-voce & Practical file.	**10**