UNIVERSITY OF PUNE
BOARD OF STUDIES IN ZOOLOGY

Revised Syllabus for S. Y. B. Sc. (Zoology) To be implemented from June, 2014

S.Y. B. Sc. (Zoology) New Syllabus

Semester-I

Paper I- ZY-211: Animal Systematics and Diversity – III

Paper II- ZY-212: Applied Zoology – I

Semester-II

Paper I- ZY-221: Animal Systematics and Diversity – IV

Paper II- ZY-222: Applied Zoology – II

Semester-I and II (Annual Examination)

Paper III- ZY-223: Practical course (Corresponding to Theory papers)

UNIVERSITY OF PUNE
BOARD OF STUDIES IN ZOOLOGY
COURSE STRUCTURE OF UNDERGRADUATE CLASSES

Class: F.Y. B. Sc. (To be implemented from June 2013)

Paper	Course No.	Term I	Term II
I	ZY 101	Animal Systematics and Diversity -I	Animal Systematics and Diversity –II
II	ZY 102	Fundamentals of Cell Biology	Genetics
III	ZY 103	Practical course	

Class: S.Y. B. Sc. (To be implemented from June 2014)

Paper	Course No.	Semester I	Course No.	Semester II
I	ZY.211	Animal Systematics and Diversity -III	ZY. 221	Animal Systematics and Diversity –IV
II	ZY.212	Applied Zoology I	ZY.222	Applied Zoology II
III	ZY.223	Practical course		

Class: T.Y. B. Sc. (To be implemented from June 2015)

Paper	Course	Semester III	Course	Semester IV
I	ZY.331	Animal Systematics and Diversity V	ZY.341	Biological Techniques
II	ZY.332	Mammalian Histology	ZY.342	Mammalian Physiology and Endocrinology
III	ZY.333	Biological Chemistry	ZY.343	Genetics and Molecular Biology
IV	ZY.334	Environmental Biology and Toxicology	ZY.344	Organic Evolution
V	ZY.335	Parasitology	ZY.345	General Embryology
VI	ZY.336	General Pathology or Cell Biology	ZY.346	Public Health and Hygiene or Medical Entomology
VII	ZY.347	Practicals corresponding to ZY 331, ZY 332, ZY 341 & ZY 342		
VIII	ZY.348	Practicals corresponding to ZY 333, ZY 334, ZY 343 & ZY 344		
IX	ZY.349	Practicals corresponding to ZY 335, ZY 336, ZY 345 & ZY 346		

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Draft of Syllabus to be implemented from June 2014

S. Y. B. Sc. Zoology

Semester-I

Paper I- ZY-211: Animal Systematics and Diversity – III

Paper II- ZY-212: Applied Zoology – I

Semester-II

Paper I- ZY-221: Animal Systematics and Diversity – IV

Paper II- ZY-222: Applied Zoology – II

Semester-I and II (Annual Examination)

Paper III- ZY-223: Practical course (Corresponding to Theory papers)

Equivalence of Previous Syllabus:

Semester	Old Course (2009 Pattern)	New Course (2014 Pattern)
Semester-I	Paper I: General Zoology and Biological Techniques-I	Paper I: Animal Systematics and Diversity –III
Semester-I	Paper II: Applied Zoology-I	Paper II: Applied Zoology-I
Semester-II	Paper I: General Zoology and Biological Techniques-II	Paper I: Animal Systematics and Diversity –IV
Semester-II	Paper II: Applied Zoology-II	Paper II: Applied Zoology-II
Annual Examination	Paper III: Practical course	Paper III: Practical course

PAPER I: FIRST SEMESTER

ZY-211: ANIMAL SYSTEMATICS AND DIVERSITY -III

1. **Salient features and classification upto classes of the following: (any two examples from each class) :** **15**

   1.1 Arthropoda :- Crustacea, Arachnida, Insecta, Myriapoda, Onychophora.

   1.2 Mollusca:- Aplacophora, Gastropoda, Pelecypoda, Scaphopoda, Cephalopoda.

   1.3 Echinodermata:- Asteroidea, Ophuroidea, Holothuria, Echinoidea, Crinoidea.

2. **Study of following with reference to:** **15**

   2.1 Arthropoda:- Mouthparts in Insects, Metamorphosis in Insects, Mimicry in Insects,

   Economic importance of Insects, Larval forms in Crustacea

   2.2 Mollusca:- Economic importance of mollusc, Shell and foot modification in mollusc,

   Torsion and Detorsion in mollusc, Larval forms in molluscs

   2.3 Echinodermata:- Origin of Echinodermata, Types of Pedicellariae, Larval forms in Echinodermata,

3. **Study of Starfish :** **18**

   4.1 Systematic position, Habit and habitat

   4.2 External characters

   4.3 Digestive system

   4.4 Water vascular system

   4.5 Reproductive system

   4.6 Autotomy and regeneration

PAPER –I: SECOND SEMESTER

ZY-221: ANIMAL SYSTEMATICS AND DIVERSITY – IV

1. Salient features of following classes and its subclasses with two examples of each: **12**

- **1.1** Reptilia
- **1.2** Aves
- **1.3** Mammalia

2. General topics: **16**

- **2.1** Poisonous and non-poisonous snakes (Two examples each)
- **2.2** Desert adaptations in reptiles in brief.
- **2.3** Beak and feet modifications in birds
- **2.4** Migration in birds
- **2.5** Aerial adaptations in birds
- **2.6** Egg laying mammals
- **2.7** Aquatic mammals

3. Study of *Scoliodon* : **20**

- **3.1** Systematic position, Habit and habitat
- **3.2** External characters
- **3.3** Digestive system, food, feeding and physiology of digestion
- **3.4** Respiratory system
- **3.5** Blood vascular system
- **3.6** Nervous system and sense organs
- **3.7** Male urinogenital system and female reproductive system

PAPER II: FIRST SEMESTER

ZY-212: APPLIED ZOOLOGY – I

1. Fisheries :

1.1 An introduction to fisheries and its types (in brief) : Freshwater fisheries, Marine fisheries, Brackish water fisheries. **2**

1.2 Different types of ponds used in fishery : Nursery pond, Rearing pond Stock pond **2**

1.3 Habit, habitat and culture methods of following freshwater forms : **10**

- **a)** Rohu (*Labeo rohita*)
- **b)** Catla (*Catla catla*)
- **c)** Mrigal (*Cirrhinus mrigala*)
- **d)** Giant prawn (*Macrobrachium rosenbergi*)

1.4 Harvesting methods of following marine forms : **4**

- ***a)*** *Harpadon*
- **b)** Mackerel
- **c)** Lobster
- **d)** Pearl oyster

1.5 Crafts and gears in Indian Fishery : **2**

a) Crafts – Catamaran, Machwa, Dinghy, Dug out canoe, Built –up boat
Gears – Gill net, Dol net, Purse net, Rampani net, Cast net

1.6 Fishery byproducts : **2**

- **a)** Fish meal
- **b)** Fish flour
- **c)** Liver oil
- **d)** Ising glass
- **e)** Fish glue
- **f)** Fish manure
- **g)** Fish fin soup

1.7 Fish preservation technique : **2**

- **a)** Chilling
- **b)** Freezing
- **c)** Salting
- **d)** Drying
- **e)** Canning

2. Agricultural Pests and their control :

2.1 An introduction to Pest, types of pests (agricultural, household, stored grain, structural, veterinary, forestry and nursery) **2**

2.2 Major insect pests of agricultural importance (Marks of identification, life cycle, nature of damage and control measures) **9**

- **a)** Jowar stem borer
- **b)** Red cotton bug
- **c)** Brinjal fruit borer
- **d)** Mango stem borer
- **e)** Pulse beetle
- **f)** Rice weevil

2.3 Non insect pest : Rats and Bandicoots, Crabs, Snails, Slugs, Birds and Squirrels **2**

2.4 Pest control practices in brief : Cultural control, Physical control, Mechanical control, Chemical control, Biological control, Pheromonal control and Concept of IPM in brief **6**

2.5 Plant protection appliances : Rotary duster, Knapsack sprayer, Cynogas Pump. **3**

2.6 Hazards of pesticides on human and antidotes. **2**

PAPER II: SECOND SEMESTER

ZY-222: APPLIED ZOOLOGY – II

1. **Apiculture :**

1.1 An introduction to Apiculture, Study of habit, habitat and nesting behavior of *Apis dorsata*, *Apis indica*, *Apis florae* and *Apis mellifera*. **3**

1.2 Life cycle, Colony organization and division of labour, Polymorphism **3**

1.3 Bee behaviour and bee communication. **3**

1.4 Bee keeping equipments : **a)** Bee box (Langstroth type) **b)** Honey extractor **c)** Smoker **d)** Bee-veil **e)** Gloves **f)** Hive tool **g)** Bee Brush **h)** Queen excluder **3**

1.5 Bee keeping and seasonal management. **2**

1.6 Bee products (collection methods, composition and uses: **a)** Honey **b)** Wax **c)** Bee Venom **d)** Propolis **e)** Royal jelly **f)** Pollen grains **4**

1.7 Diseases and enemies of Bees:

a) Bee diseases – Protozoan, Bacterial, Viral, Fungal – with two examples.

b) Bee pests – Wax moth (Greater and Lesser), Wax beetle.

c) Bee Enemies – Bee eater, King crow, Wasp, Lizard, Bear, Man. **5**

1.8 Bee pollination **1**

2. **Sericulture :**

2.1 An introduction to sericulture, Study of different types of silk moths, their distribution and varieties of silk produced by Mulberry, Tassar, Eri and Muga silk worms in India. **4**

2.2 External morphology and life cycle of *Bombyx mori*. **3**

2.3 Cultivation of mulberry (moriculture): **a)** Varieties for cultivation, **b)** Rainfed and irrigated mulberry cultivation – Fertilize schedule, Prunning methods and leaf yield. **4**

2.4 Harvesting of mulberry: **a)** Leaf plucking **b)** Branch cutting **c)** Whole shoot cutting. **2**

2.5 Silk worm rearing: **a)** Types of rearing **b)** Rearing house **c)** Rearing techniques **d)** Important diseases and pests. **7**

2.6 Post harvest processing of cocoons:

a) Harvesting and Preparation of cocoons for marketing

b) Stiffling, Sorting, Storage, Deflossing and Riddling

c) Cocoon cooking, Reeling Equipment and Rereeling, Washing and Polishing. **4**

PAPER III: FIRST AND SECOND SEMESTER

ZY-223: PRACTICAL COURSE

Practical 1.	Study and classification with reasons of the following animals Phylum Arthropoda:- Scorpion, Crab, Cockroach, Head louse, Centipede, Peripatus	(D)
Practical 2.	Study and classification with reasons of the following animals Phylum Mollusca:- Chiton, Snail, Bivalve, Dentalium, Octopus,	(D)
Practical 3.	Study and classification with reasons of the following animals Phylum Echinodermata:- Star fish, Brittle star, Holothuria, Sea Urchin, Echinus	(D)
Practical 4.	Study of permanent slides of mouthparts of the following insects : Cockroach, Mosquito, Plant bug/Bed bug, Butterfly, Honey Bee and Housefly	(D)
Practical 5.	A) Study of Shell:- Chiton, Pila, Sepia, Pecten, Dentalium, B) Study of Foot:- Chiton,Patella, Aplysia, Sepia, Octopus, Dentalium	(D)
Practical 6.	To Study the external characters and digestive system of *starfish*.	(E)
Practical 7.	A) Study of water vascular system of *starfish*. B) Temporary preparation of gonads from *starfish.*	(E) (E)
Practical 8.	A) Study of permanent slides of T. S. of arm and types of pedicellariae of *starfish*. B) Larval forms in Echinodermata.	(D) (D)
Practical 9.	Identification, Classification and study of habit, habitat and economic importance of the following: a) Rohu, Catla, Mrigal, Pomphret. b) Prawn, Crab, Oyster.	 (D) (D)
Practical 10.	Study and maintenance of Aquarium.	(E)
Practical 11.	Study of any three types of crafts and gears in fishing.	(D)
Practical 12.	Study of insect pests with respect to marks of identification, nature of damage and economic importance (Examples related to theory course)	(D)
Practical 13.	Study of pest control appliances (Sprayer/Duster)	(D)
Practical 14.	Study and classification with reasons of the following animals Class Reptilia – Cobra, Garden lizard, Turtle, Rat snake, Draco	(D)

Practical 15.	Study and classification with reasons of the following animals Class Aves – Sparrow, Crow, Parrot, Woodpecker Class Mammals – Rabbit, Mungoose, Kangaroo	(D)
Practical 16.	Identification of Poisonous and non- poisonous snakes with the help of identification key with two examples of each	(D)
Practical 17.	Study of modifications of beaks and feet in birds (Museum specimen) a) Beaks: tearing and piercing, fruit eating, mud probing, fish catching, wood chiseling and flower probing. b) Feet: perching, raptorial, climbing, swimming, running.	(D)
Practical 18.	Study of external characters and digestive system of *Scoliodon*.	(E)
Practical 19.	Study of brain of *Scoliodon*	(E)
Practical 20.	a) Temporary preparation of placoid scales from *Scoliodon* b) Study of cranial nerves, eye ball muscles of *Scoliodon* c) Study of Membranous labyrinth of *Scoliodon*	(E) (D) (D)
Practical 21.	a) Study of life cycle of Honey bee b) Study of mouth parts, thoracic appendages (legs and wings) and sting apparatus of Honey bee	(D) (E)
Practical 22.	Study of various bee keeping equipments	(D)
Practical 23.	Study of: a) bee products, b) bee pests, d) bee enemies	(D)
Practical 24.	a) Study of life cycle of *Bombyx mori*. b) Study of any five equipments in Sericulture.	(D) (D)
Practical 25.	Compulsory submission of field visit report along with at least five Photographs/ sketches of insect pest/fishes/any animal corresponding to theory courses	
Practical 26.	Compulsory study tour/visit to sea coast/fishery institute/sericulture farm/ apiculture institute / agricultural farm.	

Practical Skeleton Paper

Class – S.Y.B.Sc. **Subject – Zoology**

Time – 10.00 am onwards **Max. Marks – 80**

Q.1 – Dissect Starfish/*Scoliodon* so as to expose its.……system. (16)

Q.2 – Make a stained temporary preparation of ……

from Honey bee/Starfish/*Scoliodon* (10)

Q.3 – Identification (Non-chordates and Chordates) (21)

a) Identify and classify giving reasons (Arthropoda)

b) Identify and classify giving reasons (Mollusca/Echinodermata)

c) Identify and classify giving reasons (Cyclostomata/Reptiles)

d) Identify and classify giving reasons (Aves/Mammals)

e) Identify and describe the types of mouthparts of insect

f) Identify and describe (Shell/Foot of mollusca/Poisonous/Non poisonous snake)

g) Identify and comment on its modifications (Beak/feet modifications in birds)

Q.4 – Identification (Applied Zoology) (18)

a) Identify and give its economic importance (Any fish)

b) Identify and describe (Any gear/craft)

c) Identify and give its application (Plant protection appliance)

d) Identify and describe (One stage of life cycle of honeybee/silkworm)

e) Identify and describe (Sericulture equipment)

f) Identify and describe (Bee keeping equipment/Bee product)

Q.5 – a) Tour report and Certified Journal (05)

b) Viva- voce (05)

Q.6- Submission of field visit report along with five photographs/sketches of insect pest/fishes/any animal (05)

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ZY-211 Animal Systematics and Diversity - III

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ZY- 212 Applied Zoology Part- I

Fisheries & Agricultural pests and their Control

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ZY- 221 Animal Systematics and Diversity - IV

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ZY-222 Applied Zoology Part-II

Apiculture and Sericulture

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