

Scheme of B.Sc. III (Zoology) w.e.f. 2011-12

Semester – V					
Sr. No.	Paper code	Nomenclature	Marks		Exam. Duration
			Marks +IA	Periods/week	
1.	5.1	Aquaculture	50+05	4	3 hrs.
2.	5.2	Ecology & Evolution	50+05	4	3 hrs.
Semester – VI					
3.	6.1	Pest Management	50+05	4	3 hrs.
4.	6.2	Developmental Biology	50+05	4	3 hrs.
5.	P-501 & 601	Practical*	80	4+4	6 hrs. (Two Session) Morning & Evening
Total Semester V & VI			300		

*practical examination will be held at the end of 6th semester

SYLLABUS
B.Sc. Part-III (Theory)
SEMESTER - V

Paper 5.1
Aquaculture

Max Marks: 50+05 (Internal Assessment)

Time allotted: 3 Hours

Note : Nine questions are to be set in all and the candidates are required to attempt five questions including the compulsory question

1. Question 1 is compulsory consisting of 10 parts (1.0 marks each) covering the entire syllabus. Answer to each part should not exceed 20 words.
2. Out of remaining eight questions, two questions are to be set from each unit (I to IV), possibly splitting them in parts. Candidates are required to attempt four questions, selecting one from each unit.

Unit I

1. **Introduction to world fisheries:** Production, utilization and demand.
2. **Fresh Water fishes of India:** River system, reservoir, pond, tank fisheries; captive and culture fisheries, cold water fisheries.

Unit II

3. Fishing crafts and gears.
4. Fin fishes, Crustaceans, Molluscs and their culture.

Unit III

1. **Seed production:** Natural seed resources – its assessment, collection, Hatchery production.
2. **Nutrition:** Sources of food (Natural, Artificial) and feed composition (Calorie and Chemical ingredients).

Unit IV

3. **Field Culture:** Ponds-running water, recycled water, cage, culture; poly culture.
4. **Culture technology:** Biotechnology, gene manipulation and cryopreservation of gametes.

(SEMESTER – V)

**Paper – 5.2
Ecology & Evolution**

Max Marks: 50+05 (Internal Assessment)

Time allotted: 3 Hours

Note : Nine questions are to be set in all and the candidates are required to attempt five questions including the compulsory question

3. Question 1 is compulsory consisting of 10 parts (1.0 marks each) covering the entire syllabus. Answer to each part should not exceed 20 words.
4. Out of remaining eight questions, two questions are to be set from each unit (I to IV), possibly splitting them in parts. Candidates are required to attempt four questions, selecting one from each unit.

Unit I

1. **Basic concepts of ecology:** Definition, significance. Concepts of habitat and ecological niche.
2. **Factors affecting environment:** Abiotic factors (light-intensity, quality and duration), temperature, humidity, topography; edaphic factors; Biotic factors.

Unit II

1. **Ecosystem:** Concept, components, properties and functions; Ecological energetics and energy flow-food chain, food web, trophic structure; ecological pyramids concept of productivity.
2. **Biogeochemical cycles:** Concept, reservoir pool, gaseous cycles and sedimentary cycles.
3. **Population:** Growth and regulation.

Unit III

Origin of life.

1. Concept and evidences of organic evolution.
2. Theories of organic evolution.
- 3.. Concept of microevolution and concept of species

Unit IV

1. Concept of macro-and mega-evolution.
2. Phylogeny of horse.
3. Evolution of man.

SEMESTER - VI
Paper 6.1
Pest Management

Max Marks: 50+05 (Internal Assessment)

Time allotted: 3 Hours

Note : Nine questions are to be set in all and the candidates are required to attempt five questions including the compulsory question

1. Question 1 is compulsory consisting of 10 parts (1.0 marks each) covering the entire syllabus. Answer to each part should not exceed 20 words.
2. Out of remaining eight questions, two questions are to be set from each unit (I to IV), possibly splitting them in parts. Candidates are required to attempt four questions, selecting one from each unit.

Unit I

Study of important insect pests of crops and vegetables :

1 **Sugarcane:**

- (a) Sugarcane leaf-hopper (*Pyrilla perpusilla*)
- (b) Sugarcane Whitefly (*Aleurolobus barodensis*)
- (c) Sugarcane top borer (*Sciropophaga nivella*)
- (d) Sugarcane root borer (*Emmalocera depresella*)
- (e) Gurdaspur borer (*Bissetia steniellus*)

With their systematic position, habits and nature of damage caused. Life cycle and control of *Pyrilla perpusilla* only.

2 **Cotton:**

- (a) Pink bollworm (*Pestiphora gossypifolia*)
- (b) Red cotton bug (*Dysdercus Cingulatus*)
- (c) Cotton grey weevil (*Myllocerus undecimpustulatus*)
- (d) Cotton Jassid (*Amrasca devastans*)

With their systematic position, habits and nature of damage caused. Life cycle and control of *Pectinophore gossypiella*.

Unit II

3 **Wheat:**

Wheat stem borer (*Sesamia inferens*) with its systematics position, habits, nature of damage caused. Life cycle and control.

4 **Paddy:**

- (a) Gundhi bug (*Leptocorisa acuta*)
- (b) Rice grasshopper (*Hieroglyphus banian*)
- (c) Rice stem borer (*Scirpophaga incertullus*)
- (d) Rice Hispa (*Diceladispera armigera*)

With their systematic position, habits and nature of damage caused. Life cycle and control of *Loptocorisa acuta*.

Unit III

5 Vegetables

- (a) *Raphidopalpa faveicollis* – The Red pumpkin beetle.
- (b) *Dacus cucurbitas* – The pumpkin fruit fly.
- (c) *Tetranychus tecarius* – The vegetable mite.
- (d) *Epilachna* – The Hadda beetle.

Their systematic position, habits and nature of damage caused. Life cycle and control of *Aulacophora faveicollis*.

6 Stored grains:

- (a) Pulse beetle (*Callosobruchus maculatus*)
- (b) Rice weevil (*Sitophilus oryzae*)
- (c) Wheat weevil (*Trogoderma granarium*)
- (d) Rust Red Flour beetles (*Tribolium castaneum*)
- (e) Lesser grain borer (*Rhizopertha dominica*)
- (f) Grain & Flour moth (*Sitotroga cerealella*)

Their systematic position, habits and nature of damage caused. Life cycle and control of *Trogoderma granarium*.

Unit IV

- 6. **Insect control:** Biological control, its history, requirement and precautions and feasibility of biological agents for control.
- 7. **Chemical control:** History, Categories of pesticides. Important pesticides from each category to pests against which they can be used. Insect repellants and attractants.
- 8. Integrated pest management.
- 9. Important bird and rodent pests of agriculture & their management.

SEMESTER - VI
Paper 6.2
Developmental Biology

Max Marks: 50+05 (Internal Assessment)

Time allotted: 3 Hours

Note : Nine questions are to be set in all and the candidates are required to attempt five questions including the compulsory question

1. Question 1 is compulsory consisting of 10 parts (1.0 marks each) covering the entire syllabus. Answer to each part should not exceed 20 words.
2. Out of remaining eight questions, two questions are to be set from each unit (I to IV), possibly splitting them in parts. Candidates are required to attempt four questions, selecting one from each unit.

Unit I

1. Historical perspectives, aims and scope of developmental biology.
2. Generalized structure of mammalian ovum & sperm. Spermatogenesis and Oogenesis.

Unit II

1. Fertilization, parthenogenesis, different types of eggs and patterns of cleavage in invertebrates and vertebrates.
2. Process of blastulation in invertebrates and vertebrates
3. Fate-map construction in frog and chick.

Unit III

1. Gastrulation in invertebrates and vertebrates
2. Gastrulation & formation of three germinal layers in frog and chick.
2. Elementary knowledge of primary organizers.

Unit IV

1. Extra embryonic membranes: structure & significance in birds and mammals.
2. Concepts of competence, determination and differentiation.
3. Concept of regeneration.

B.Sc. Part-III
Semester V
PRACTICAL PAPER (P-501)

1. Identification of *Catle*, *Labeo rohita*, *L. calbasu*, *Cirrhius*, *mrigala* *Puntius sarana*, *Channa punctatus*, *C. marulius*. *C. stariatus*, *Trichogaster fasciata*, *Mystus seenghala*, *M. cavasius*, *M. tengra*, *Callichrous pabola*, *C. bimaculatus*, *Wallago attu*, *Prawns*, *Crabs*, *Lobsters*, *Calms*, *Mussels* & *Oysters*.
2. Chemical analysis of pond water and soil for pH, dissolved oxygen, free CO₂ nitrates, phosphates and chlorides.
3. A study of the slides of fish parasites.
4. A study of the different types of nets, e.g., cast net, gill net, drift net and drag net.
5. A visit to lake/reservoir/fish breeding centre.
6. Adaptative modifications in feet and beaks of birds.
7. Preparation of permanent/temporary slides of developmental stages of frog/mosquito.
8. Study of permanent slides of WM of chick embryo (13-18h, 24-36h, 36-48h, 48-72h).
9. Window preparation and identification of stages of development in chick egg.
10. **Histology:** Preparation of permanent histological slides of testis, ovary, kidney, intestine, liver of rat (H and E staining).

B.Sc. Part-III
PRACTICAL PAPER (P-601)

1. External morphology, identification marks, nature of damage and host of the following pests:
 - (i) **Sugarcane:** Sugarcane leaf-hopper, Sugarcane whitefly, Sugarcane top borer, Sugarcane root borer, Gurdaspur borer (any two).
 - (ii) **Cotton:** Red Cotton bug
 - (iii) **Wheat:** Wheat stem borer
 - (iv) **Paddy:** Gundhi bug, Rice grasshopper, Rice stem borer, Rice hispa (any one).
 - (v) **Vegetables:** *Aulocophora faveicollis*, *Dacus cucurbitas*, *Tetranychus tecarious*, *Epilachna* (any three).
 - (vi) **Pests of stored grains:** Pulse beetle, Rice weevil, Grain & Flour moth, Rust-red flour beetle, lessergrain borer (any three).
2. Stages of life history of silk moth and honey bee.

B.Sc. PART- III (Practical)
Guidelines/ Instructions for Practical (Paper-501 & 601)

Max. Marks: 80 (40+40)

Time allowed: 6 Hours
(2 session M&E)

- | | | | |
|----|---|---|------------------|
| 1. | Chemical analysis of water/soil | : | 05 marks |
| 2. | Identification and Classification of specimens (Eight) | : | 16 marks |
| 3. | Ecological note on economically important specimen (two) | : | 06 marks |
| 4. | Identification of histological and embryological slides with reasons of identification (Two); feet and beaks of birds | : | 08 marks |
| 5. | Permanent preparation of histological slides | : | 15 marks (5,5,5) |
| | (a) Section cutting and stretching | | |
| | (b) Staining, mounting, (c) identification & sketch | | |
| 6. | Field report | : | 10 marks |
| 7. | Practical note book | : | 08 marks |
| 8. | Viva-voce | : | 12 marks |

Note: Field report to be submitted alongwith answer books.