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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(1st Semester)

ZOOLOGY

Paper Code: ZOO – 101B Bio Chemistry and Cell Biology

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External Marks: 40

Internal Marks: 10

Total Credits:03

Total Marks: 50

Unit-I

Bio Chemistry:- Introduction, Classification, Structure, Function and General properties of various biomolecules.

Biomolecules	:	Proteins, Carbohydrates, Lipids
Enzymes	:	Nomenclature, classification and mechanism of enzyme action

Unit-II

Vitamins	:	Name, Source and Function
Hormones	:	Chemical nature and function, and mechanism of action.

Unit-III

Cell Biology:-

Immunology:- Overview of immune system, cells of immune system and organs, innate and acquired immunity, Generation of immunogenicity, recognition of antigens of B-cell epitops, Antigen – Antibody interactions, immune system in health and disease,

Unit-IV

Cancer Biology:- Types of Cancer, An elementary idea of cell transformation in cancer, Types of tumors, Therapy of cancer

Structural and functional components eukaryotes, polytene and lampbrush chromosome.

Golgi bodies, centrosomes, structure of cilia and flagillae.

Suggested Books:-

- 1 De Robertis, E.D.P., De Robertis, E.M.F., Cell Biology and Molecular Biology, 8th ed., W.B. Saunders Co., Philadelphia, 1995.
- 2 Rechar, A.G. Kidt, T.J. Osborn, B.A. and Rodwell, V.W., 2003. Immunology, W. H. Freeman and Co. New York.
- 3 Roitt. T.M. Essential Immunology. Blackwell Scientific Publications. 2001.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(1st Semester)

ZOOLOGY

Paper Code: ZOP 101

Practical

L – T – P

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Total Credits:02

Total Marks: 50

External Marks: 40

Internal Marks: 10

1. Classification up to orders with ecological notes and economic importance of the following animals.

(1) A . Protozoa:

(a) Examination of eluters of *Amoeba*, *Euglena* and *Paramecium*.

(b) **Permanent Slides :** *Amoeba*, *Euglena*, *Trypanosoma*, *Noctiluca*, *Ememeria*, *Monocystis*, *Paramicium* (Binary fission and conjugation) *Opalina*, *Vorticella*, *Blantidium*, *Nictotherus* and *Polytomella*.

B. Parazoa:

(a) **Specimens :** *Sycon*, *Grantia*, *Euplectella*, *Hylonema*, *Spongilla* and *Euspongia*.

(b) **Permanent Slides :** T.S. *Sycon*, L.S. of *Sycon*

C . Coelenterata:

(a) **Specimens:** *Porpita*, *Velella*, *Physalia*, *Aurelia*, *Rhizostoma*, *Metridium*, *Millipora* and *Alcyonium*, *Tubipora*, *Zoanthus*, *Medrepora*, *Favia*, *Fungia* and *Astrea*.

(b) **Permanent Slides :** *Hydra* with buds, *Obelia* (colony and medusa), *Sertularia*, *Plumularia*, *Bouganvillea*

D. Platyhelminthies:

(a) **Specimens:** *Dugesia*, *Faciola*, *Taenia* and *Echinococcus*.

(b) **Permanent Slides:** Miracidium, Sorocyst, Redia, Cercaria larva of *Fasciola*, Scolex and Proglotids of *Taenia* (mature and gravid).

E. Aschelminthes:

(a) **Specimens:** *Ascaris* (male and female), *Trichinella*, *Ancylostoma* *Meloidogyne*.

(b) **Permanent Slides:** T.S. of *Ascaris* (male and female).

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(a) **Specimens:** *Pheritima*, *Nereis*, *Heteronereis*, *Polynoe*, *Aphrodite*, *Tubificoides*, *Arenicola* and *Potobdella*.

(b) **Permanent Slides :** T.S. of earthworm through pharynx, gizzard, seminal vesicles, prostate Glands and typhlosol, intestine of earthworm and T.S. of Leech through pharynx.

2. **Dissection of Leech** Demonstration of - Digestive , Reproductive and nervous systems.
3. Temporary and permanent slide formation (staining and mounting) and identification of class working material –
 - (a) Gemmules, Spicules and Spongofibers of Sponge.
 - (b) *Euglena*, *Hydra*, *Obelia*, *Plumularia*, *Sertularia*, *Bougainvillea* etc.
4. Biochemical test for Sugar, Protein and Fat.
5. Test of Salivary amylase activity : Effect of temperature, PH, Concentration.
6. Estimation of abnormal constituents of Urine (Albumin, Sugar, Ketonebodies)

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(2nd Semester)

ZOOLOGY

Paper Code: ZOO-102A

Animal Diversity Non Chordata-11
(Arthropoda to Hemichordata)

Total Credits:03

Total Marks: 50

External Marks: 40

Internal Marks: 10

Unit- I

General character and classification up to orders with examples.

Arthropod : Periplaneta (cockroach), Prawn, Social Organizations in insects (honey bee and termite), life cycle of Anopheles and Culex and economic importance of insects.

Unit-II

Mollusca : Type study - Pila
Torsion and Detorsion in Gastropoda

Unit- III

General character and classification upto orders with examples.

Echinodermata : Asterias (Starfish), Larval forms in Echinodermata, Phylogeny and Affinities of Echinoderms.

Unit-IV

Hemichordata : Balanoglossus, Habitat and Habits External Characters Bodywall, Coelom skeleton Various Systems and affinities.
Aristotle's Lantern

Suggested Books:-

Dhami, P.S. and Dhami, J.K., Invertebrates, R. Chand and Co., New Delhi, 2001.
Barnes, R.D. Invertebrates Zoology, W.B. Saunders, Philadelphia, 1999.

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Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(2nd Semester)
ZOOLOGY

Paper Code: ZOO-102B Ecology

Total Credits:03
Total Marks: 50

External Marks: 40
Internal Marks: 10

Unit- I

- Ecology : Definition, Significance, Concept of habitat and ecological Niche, Subdivisions and scope of ecology.
Ecosystem : Components, ecological energetic, food web, introduction to major ecosystems of the world.

Unit-II

- Ecological factors : Abiotic factors (Temperature, light and soil as ecological factors), Distribution of animals based on ecological factors.
Biotic Community : Characteristics, Ecological succession.
Nutrients Cycle : Biogeochemical cycles & concept of limiting factors..

Unit – III

- Ecological adaptations : Morphological , physiological and behavioral adaptations In animals in different habitats
Population : Characteristics, Growth and regulation of population. Migration in fishes and birds, Parental care in Animals. Inter and intraspecific relationship – Competition, Predation, Parasitism, Commensalisms and Mutualism

Unit-IV

- Natural resources : Renewable and nonrenewable natural resources Conservations.
Environmental Pollution : Causes, impact and control of environmental pollution (Air water, soil, Plastic and noise), Environmental degradation.

Suggested Book :

1. Kormondy, E.J., Concepts of Ecology, Englewood Cliffs, N.J., Prentice Hall Inc., 1975.
2. Krebs, C.J., Ecology, Harper & Row, New York, 1982.
3. Odum, E.P., Fundamentals of Ecology W.B. Saunders Co., Philadelphia, 1995.
4. Dhama, P.S. & Dhama, J.K. , Invertebrates, R. Chand & Co., New Delhi, 2001

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(2nd Semester)

ZOOLOGY

Practical

Paper Code: ZOP-102

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External Marks: 40

Internal Marks: 10

Total Credits:02

Total Marks: 50

1. **A Arthropoda** : *Periapts Palaemon* (Prawn), *lobster Cancer* (crab) , *Sacculina*, *Eupagurus* (Hermit crab) *Lepas* , *Balanus*, *Cyclops*, *Daphnia*, *Lepisma*, *Periplaneta* (Cockroach), *Schistocerca* (Locust) *Poecilocerus* (Ak grasshopper), *Gryllus* (Cricket), *Mantis* (Pryingmantis) *Cicada*, *Forjicula* (Earwig), Dragonfly, termite queen, bug, moth, beetle, *Polistes* (Wasp), *Apis* (honey bee), *Bombyx*, *Pediculus* (Body louse), *Millipede* and *Centipede*, *Palamnaeus* (Scorpion), *Aranea* (Spider) and *Limulus* (King crab).
- B. Mollusca** : *Mytilus*, *Ostrea*, *Cardium*, *Pholas*, *Solen* (Razor fish), *Pecten*, *Haliotis*, *Patella*, *Aplysia*, *Doris*, *Limax*, *Loigo*, *Sepia*, *Octopus*, *Nautilus* shell (Complete and T.S.), *Chiton* and *Dentalium*.
- C. Echinodermata** : *Asterias*, *Echinus*, *Ophiothrix* and *Antedon cucumaria*, *Asterophyton*.
- D. Hemichordata** : *Balanoglossus*.
2. Study of the following permanent stained preparations:
 - a. Insect trachea, Mouth parts of *Periplaneta* (Cockroach).
 - b. Radula and osphradium of *Pila*.
 - c. T.S. Starfish (Arm).
 - d. T.S. *Balanoglossus* (Through various regions).
3. Preparation of the following slides:
 - a. Temporary preparation of Slide of Mouth parts and trachea of Grasshopper,
 - b. Radula and osphradium of *Pila*.
 - c. Pedicillarae of *Asterias*.
4. Dissections of the following animals:
 - a. *Periplaneta* / Grass Hopper : Digestive system, mouth parts and trachea.
 - b. *Pila* : Pallial complex, digestive and nervous systems.(Demonstration only)
5. **ECOLOGY**
 - a. Study of animal adaptations with the help of specimens, charts and model.

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- b. Study of Zoogeographical regions and their fauna.
- c. Study of biotic components of an ecosystem (pond ecosystem, artificial ecosystem i.e. grassland, cropland).
- d. Study of different types of nests in birds, different type of beak & feet of various birds.
- e. Study & preparation of zoogeographical charts.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(3rd Semester)

ZOOLOGY

Paper Code: ZOO-201A

**Animal Diversity Chordata-1
(Protochordate to Amphibia)**

L - T - P

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External Marks: 40

Internal Marks: 10

Total Credits:03

Total Marks: 50

Unit- I

Chordate : General characters and classification up to order level with examples.

Origin and evolutionary tree of chordates.

Protochordates : Systematic position, distribution, ecology, Morphology & Anatomy, Affinities
Type study of *Herdmania* (Urochordate).

Unit-II

Cyclostomes : *Amphioxus* (Cephalochordate).
: Type study of *Petromyzone*.

Unit- III

Chordate : General characters and classification up to order level with examples.

Pisces : Type study of *Labeo*
Scales & fins of fishes, Parental care in fishes, Fish migration.

Unit-IV

Amphibia : Type study of frog (*Rana Tigrina*).

Suggested Books:-

1. Colbert, E.H., Evolution of vertebrates, II Edition Wiley Ltd. 1989.
2. Dhami, P.S. and Dhami, J.K., Vertebrates, R. Chand and Co., New Delhi, 1997.
3. Kotpal's vertebrates.

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Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(3rd Semester)
ZOOLOGY

Paper Code: ZOO-201B Developmental biology and Evolution

L - T - P

3 - - -

External Marks: 40

Internal Marks: 10

Total Credits:03

Total Marks: 50

Unit- I

.Developmental biology

Historical perspectives, aims and scope of developmental biology.
Generalize structure of mammalian ovum & sperm/ spermatogenesis and oogenesis, fertilization, parthenogenesis, different types of eggs and patterns of cleavage.
Process of blastulation and fate-map construction in chick.

Unit-II

Gastrulation in chick upto the formation of three germinal layers.
Elementary knowledge of primary organizer.
Concepts of competence, determination of differentiation.
Extra embryonic membranes and regeneration.

Unit II

Evolution ; Origin of life.

Concept and evidences of organic evolution.
Theories` of organic evolution: Lamarckism, Darwinism, Neo- Darwinism,

Unit-IV

De' Varies mutation theory, Modern theory of evolution .
Concept of micro-evolution, macro-evolution and mega-evolution. Concepts of species, Modes of speciation.
Evolution of man.

Suggested Book:

1. Dobzhansky, Ayala, Stebbins & valentine, Evolution, W.H. Freeman , 1952.
2. Colbert, E.H., Evolution of Vertebrates, II Edition Wily Easten Ltd .,1989
3. Bhamrah, H.S. Juneka, K., Cytogenetics & Evolution, Anmol Publication Pvt.Ltd . 1993.
4. Davenport. An out line of Animal Development Addisom-Wesly.

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5. Gilbert, S.F. (1991) Developmental Biology. Sinauer Associates Inc Publishers.
6. Oppenheimor, S.B. (1981) Introduction to Embryology, Allyn and Bacon. Sussman Animal Growth and Developmental Prentice Hall.

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Syllabus of B.Sc. (Medical)**w.e.f. July 2017****(3rd Semester)****ZOOLOGY****Practical****Paper Code: ZOP-201****L – T – P****-- -- 4****Total Credits:02****Total Marks: 50****External Marks: 40****Internal Marks: 10**

Protochordata	:	<i>Branchiostoma, balanoglossus, Herdmania</i> and a colonial <i>Urochordata</i>
Fishes	:	<i>Petromyzone pristis, Zygarna, Opiocephalus Clarius. Labeo, Mystis, Anguila, Syngnathus, Hippocampus, Tetradon, Ostacodon, Solea, Exocoetus.</i>
Amphibia	:	<i>Salamender, Necturus, Hyla, Raeophorus, Bufo,</i> limbless amphibian.
Skeleton	:	<i>Labeo</i> and Frog.
Temporary mounts	:	Placoid, cycloid and ctenoid scales . Wheel organ of <i>amphioxus</i> .
Dissection	:	<i>Hedrmania</i> : General Anatomy (Demonstration only) <i>Labeo</i> : Digestive System, Reproductive system and Excretory System.
Slides	:	Study of permanent slides of WM of chick and frog embryo (13-18h, 24-36h, 36-48h, 48-72h) Window preparation and identification of development in chick egg.
Project	:	Based on theory papers.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(4th Semester)

ZOOLOGY

**Paper Code: ZOO-202A Animal Diversity Chordata-11
(Reptilia to Mammals)**

Total Credits:03

Total Marks: 50

External Marks: 40

Internal Marks: 10

Unit-I

Chordate : General characters and classification up to order level with examples.

Reptilia :
1. Type Study of Lizard (*Hemidactylus*).
2. Origin, Evolutionary tree, Extinct reptiles.
3. Poisonous and Non Poisonous Snakes, Poison Apparatus in Snakes.

Unit-II

Aves : Type study of Pigeon (*Columba Livia*), Flight Adaptations, Airodynamics in birds, feathers, migration in birds.

Unit-III

Chordate : General characters and classification up to order level with examples.

Mammals : Type Study of Rat. (Includes detailed study of various systems of The animal)

Unit-IV

Skin and its derivatives, Dentition, Stomach and Adaptive radiation.

Suggested Books:-

4. Dhami, P.S. and Dhami, J.K., Vertebrates, R. Chand and Co., New Delhi, 1997.
5. Parker, T.J. and Haswell, W.A. Text Book of Zoology, Vol.II (vertebrates) ELBS and Macmillan Press Ltd. 1981.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(4th Semester)

ZOOLOGY

Physiology

Paper Code: ZOO-202B

L – T – P

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External Marks: 40

Internal Marks: 10

Total Credits:03

Total Marks: 50

Unit-I

Digestion : Nutritional components: Proteins, carbohydrates, fats, lipids, vitamins and minerals. Types of nutrition and feeding. Digestion and dietary constituents, viz, lipids, proteins, carbohydrates and nucleic acids. Symbiotic digestion. Absorption of nutrients and assimilation. Control of enzyme secretion.

Unit-II

Circulation : Origin, Conduction and regulation of heart beat, Cardiac cycle, Electrocardiogram, Cardiac output, Fluid pressure and flow pressure in closed and open circulatory system, Composition and functions of blood and lymph. Mechanism of coagulation factors, anticoagulants, Haemopoiesis.

Unit-III

Control and Coordination: Nervous integration and chemical integration of endocrinology, Nature, origin and propagation of nerve impulse, Structure and mechanism of hormone action, Physiology of Pituitary, Thyroid, Parathyroid, Adrenal, Pancreas and Gonads.

Respiration : Exchange of respiratory gases, Transport of gases, lung air volumes, Oxygen dissociation curve of Haemoglobin. Bohr's effect. Hamburger's phenomenon (Chloride shift), control of respiration.

Unit-IV

Excretion : Patterns of excretory products viz., Ammonotelic, ureotelic and uricotelic, Ornithin cycle (Kreb's- Hanseleit cycle) for urea formation in liver. Urine formation, counter-current mechanism of urine concentration, osmoregulation, Micturition.

Reproduction : Gametogenesis, Structure of Gametes, Ovulation, Capacitation, Fertilization, gestation and parturition.

Suggested Books:-

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1. Taneja, S.K., Biochemistry & animal physiology, Truman Book Co., 1997.
2. Guyton, A.S., Text Book of Medical Physiology, 7th ed., W.B. Saunders.
3. Marub, A. Human Anatomy and Physiology. The Benjamin Cumming publishing Company, California.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(4th Semester)

ZOOLOGY

Practical

Paper Code: ZOP-202

L – T – P

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Total Credits:02

Total Marks: 50

External Marks: 40

Internal Marks: 10

General characters and classification up to orders with examples. (Reptilia to mammalia)

Reptila Specimen : *Chelone, Testudo, Trionyx, Hemidactylus, Calots, Varanus, Uromastix, Ophiosaurus, Chamaeleon, Draco, Python, Eryx, Natrix, Ptyas, Dendrelaphi, Bungarus, Naja, Hydrus Enhydrina, Viper and Crocodilus.*

Aves Specimen : Casuarius, Arden, Anas, Milvis, Pavo, Eudynamis, Tyto, Alerdo and Halcyon. Temporary mounts-barbs, Study of a dozen common birds of Haryana, types of feathers .

Mammalia Specimen : Study of *Ornithorhynchus, Pteropus, Echidna, Dedelphis Pteropus, Macropus ,cannis, Loris, Oryctolagus, Funambulus* and *Herpestes Capra*, Cat, langur, *macacca*, hedgehog, shrew, insectivorous bat,

Osteology - :Disarticulated skeleton of fowl; different types of palate in birds.Disarticulated skeleton of *Varanus*, skull lower jaw, carapace and Plastron of tortoise. Rabbit and Human skull.

Dietary Adaptation- Frugivorous bat , squirrel and mongoose.

Dissections - Arterial, venous and Urinogenital systems, Neck region, rar ossicles and brain of white rat. (Demonstration only)

Permanent Slides :-

Mammalian skin, salivary glands, oesophagus, stomach, duodenum, ileum, rectum, liver, pancreas; spleen, trachea , lung, kidney, cartilage, bone, pituitary, adrenal, thyroid, Parathyroid, ovary and testis.

2. Report on field trip to Zoological Park, National Museum of Natural History or a Wildlife sanctuary/national park.
3. Effects of isotonic, hypotonic and hypertonic solution on erythrocytes.

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4. Enumeration of red blood cells using haemocytometer
5. Enumeration of the total and different types of white blood cells
6. Estimation of hemoglobin content of blood using Sahli's haemometer.
7. Preparation of haemin crystals.
8. Demonstration of the knee jerk reflex.
9. Recording of blood pressure using a sphygmomanometer.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(5th Semester)

ZOOLOGY

Paper Code: ZOO-301A

Economic Zoology-I

L - T - P

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External Marks: 40

Internal Marks: 10

Total Credits: 03

Total Marks: 50

Unit- I

Study of importance of insect pests of crops and vegetable crops:

1. Sugarcane :

- a) Sugarcane leaf hopper (*Pyrilla perpusilla*)
- b) Sugarcane whitefly (*Aleruolobus barodensis*)
- c) Sugarcane top borer (*Scirpophaga nivella*)
- d) Sugarcane root borer (*Emalocera depresella*)
- e) Gurudaspur boror (*Bissetia Steniellus*)

With their systemic position, habit and nature of damage caused. Life cycle and control of *Pyrilla. Perpusilla* only.

2. Cotton :

- a) Pink bollworm (*pectinophora gossypiella*)
- b) Red cotton bug (*Dysdercus koenigii*)
- c) Cotton grew weevil (*Myllocerus undercimpustulatus*)
- d) Cotton jessed (*Empoasca devastans*)

With their systemic position. habits and nature of damage caused. Life cycle of control of *pectinophora gossypiella*.

3. Wheat :

Wheat stem borer (*Sesamia inferens*) with systemic position, habit, and nature of damage caused Life cycle of & control.

4. Paddy :

- a) Gundhy bug (*Leptocorisa varicornus*)
- b) Rice grasshopper (*Hieroglyphus banian*)
- c) Rice stem borer (*Scirpophaga incertullus*)
- d) Rice hipsa (*Hispa armigera*)

With their systemic position, habits and nature of damage caused. Life cycle and control of *leptocorisa varicornus*.

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Unit- II

1. Vegetables pests :

- Raphidopalpa faveicollis* - The red pumpkin beetle.
 - Dacus cucurbitas* - The red pumpkin fruit fly.
 - Tetranychus tecarius* - The vegetable mite.
 - Epilachna* - The Hadda beetle
- With their systemic position, habits and nature of damage caused.
Life cycle & control of *Aulacophora faveicollis*

2. Pests of stored grains:

- Pulse beetle (*Callosobruchus maculatus*)
- Rice weevil (*Sitophilus oryzae*)
- Wheat weevil (*Trogoderma granarium*)
- Lesser grain borer (*Rhizopertha dominica*)
- Grain and flour moth (*Sitotroga cerealella*)

Unit-III

3. Pest Control:

- Physical Control
- Chemical Control : History, categories of pesticides, from each category of pest against which they can be used, Insect repellent and attractant.
- Biological Control : History, requirement and precautions and Feasibility of biological agents for control.
- Hormonal Control : History, requirement and precautions and Feasibility of biological agents for control.
- Legal Control.
- Integrated Pest Management.

Unit-IV

Some Useful Insects :

Their systemic position, life cycles & their uses.
(honey bee, lac insect, silk moth etc.)

Suggested books :

- Perry A.S Yamamoto, I.I shaay and R.Perry , Insecticides in Agriculture and Environment-Narora Publishing House.
- B.S Parmer & S.S Tomar Pesticides formulation CBS Publishers and distributors, New Delhi .
- R.Wade, M.Dekker, Pesticide Formulation.
- G. Shukla G.S Upadhyay Economic Zoology .V.B Rastogi publications Meerut.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(5th Semester)

ZOOLOGY

Genetics

Paper Code: ZOO-301B

L – T – P

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External Marks: 40

Internal Marks: 10

Total Credits:03

Total Marks: 50

Unit- I

DNA as Information :

Discovery of Gene

Structure of Gene

Mapping of gene

Translation

Transcription

DNA Replication

Unit-II

Recombination in bacteria (Conjugation, transformation and transduction).

Mutation :

Spontaneous & induced mutations, gene mutations, physical and chemical basis of mutations, transversion, structural chromosomal aberrations .

Unit III

Human genetics :

Human karyotype, Chromosomal abnormalities involving autosomes and sex chromosomes, Monozygotic twins, Sex determination, Inborn errors of metabolism.

Unit-IV

Eugenics, eugenics & eugenics :

Genetic counseling, Pre-natal diagnostics, DNA-finger printing, transgenic animals.

Population Genetics: Hardy-Weinberg equilibrium, Role of

Migration, mutation & genetic drift in altering gene frequency.

Suggested Books :

1. Benjamin P.A.B. (2002) Genetics : A conceptual Approach, W.H. Freeman and Co. New York.
2. Brown, T.A. Genome : John Wiley & Sons (Asia) PTE Ltd.
3. Russel, P.J. (1998) Genetics : The Benjamin Cummings Publishing cone . Inc.
4. Benjamin Lewin, Gene Oxford.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(5th Semester)

ZOOLOGY

Practical

Paper Code: ZOP-301

L - T - P

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Total Credits:02

Total Marks: 50

External Marks: 40

Internal Marks: 10

1. External morphology, identification marks, nature of damage & host of the following pests;-

- i) **Sugarcane** : Sugarcane leaf hopper, sugarcane whitefly, sugarcane top borer, sugarcane root borer, Gurdaspur borer.
- ii) **Cotton** : red cotton bug.
- iii) **Wheat** : Wheat stem borer
- iv) **Paddy** : Gundhi bug, rice grasshopper, rice stem borer, rice hispa.
- v) **Vegetable**: *Aulocophora faviacollis*, *Dacus cucurbitas*, *Tetranychus tectorius*, *Epilachna* (Any three).
- vi) **Pest of stored grains**: Pulse beetle, Rice weevil, Grain & flour moth, Red flour beetle, lesser grain borer (Any three).

2. Stages of life history of silk moth & honey bee.
3. Demonstration of law of segregation, Independent assortment & epistasis. Numerical for segregation & Independent assortment.
4. Segregation demonstration in preserved material.
5. Inheritance of other human characteristics, ability to taste PTC, thiourea.
6. Study of polytene chromosomes of *Chironomus*/ *Drosophila* through permanent slide.
7. Dermatographics: Plam print taking & finger tip patterns.
8. Collection & Identification of Pests.

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Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(6th Semester)
ZOOLOGY

Paper Code: ZOO-302A Economic Zoology-II

L – T – P
3 - - -

Total Credits:03
Total Marks: 50

External Marks: 40
Internal Marks: 10

Note- Attempt five questions in all, selecting two questions from each unit. Question number 1 is compulsory (short answer type). Nine questions are to be set, spread over the entire syllabus.

Unit- I

Aquaculture :

Introduction to world Fisheries
Fresh water fishes of India.
River System, Reservoir, Pond/ Tank fisheries, captive and culture fisheries, Cold water fisheries.
Fishing crafts & gears.

Unit-II

Seed production.
Fish Feed.
Fish Culture technology.
Composite Culture & Monoculture.
Fin Fish, Crustaceans, Molluscs and their culture.

Unit- III

Poultry Culture :

Introduction, Habitat, Houses, Food & Feeding of fowl.
Breeds of fowl.
Precautions for Hatching, rearing of chicken.
Poultry Products.

Unit-IV

3

Piggery :

- i) Introduction, Habitat, Houses, Food & Feeding .
- ii) Breeds.
- iii) Products.

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Suggested Books:-

1. Jhingran V.G:- Fish and fisheries of India, Hindustan publishing corporation of India , Delhi 1991.
2. Fishes of India vols . I & II :-Frances Days , Reprinted Edition Jagmander Book Agency, New Delhi 1994.
3. Johal M.S & K.L:- Monograph on the Fishes of Reorganized Panjab, Pb Fisheris Bulletin, vol. I& II,1980.
4. Agarwal S.C & Johal M.S:- Fishery Development, Narendra Publishing House, Delhi 1907.
5. Johal M.S & Tandon K.K. :- Fishes of Punjab, Res, Bull, Panjab Univesity vol . 32.PP . 103-104 1981.
6. Karl f legler :- Freshwater fish ery Biology, wn c-Brown company Pub, Dubaque. Iowa, USA 1969.
7. Shukla G S and Upadhaya V. B: Economic Zoology Rastogi Publications Meerut.
8. Satnaragana, U. 'Bioteehnology' Books and Allied CP, Ltd. Kolkata 7000 10 (India)
9. Brown T.D (1999) Gene cloning and DNA Analysis. Blackwall Sciena.
10. Powar C.B; Cell Biology; Himalayan Publishing house. Mumbai 400004.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2017

(6th Semester)

ZOOLOGY

Paper Code: ZOO-302B Biotechnology and Bioinformatics

L – T – P

3 – – –

Total Credits:03

Total Marks: 50

External Marks: 40

Internal Marks: 10

Note- Attempt five questions in all, selecting two questions from each unit. Question number 1 is compulsory (short answer type). Nine questions are to be set, spread over the entire syllabus.

Unit-I

Definition, Scope & History of Biotechnology, Biotechnology tree, Structure of DNA & RNA.

Basic tools In Biotechnology:-

- (i) Enzymes: Types of enzymes, Most commonly used enzyme
- (ii) Vectors: Types of vector
- (iii) Passenger DNA

Unit-II

Techniques in Biotechnology:- Agarose gel electrophoresis, Isolation and purification of nucleic acid, Isolation of Chromosomes, Nucleic acid blotting techniques, DNA Sequenceing, Alternate method of DNA Sequencing, Chemical Synthesis of DNA. Methods of gene transfer, Polymerase chain Reaction, Production of monoclonal antibodies,

Unit-III

Construction of gene library, Radiolabeling of nucleic acids, Cloning of DNA, Chimeric DNA, Copying of messenger RNA into DNA.

4. Regulation of gene expression.

Unit-IV

Culture Technology & Bioinformatics

Animal cell culture, Tissue and organ cultures, *In vitro* Fertilization & Embryo Transfer, Transfection methods and transgenic animals, Cryopreservation.

Definition, components of Bioinformatics, Internet and Bioinformatics. Biological database and Application of Bioinformatics in drug designing. Use of Computer in the field of Zoology.

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Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(6th Semester)
ZOOLOGY

Paper Code: ZOP-302

Practical

L – T – P

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Total Credits:02

Total Marks: 50

External Marks: 40

Internal Marks: 10

1. Identification of food Fish :
Catla, *Labiorohita*, *L. Calbasu*, *Cirrhina mrigala*, *Barbus Sarana*, *Ophlocephalus punctatus*, *O. Marulis*, *O. satiates*, *Trichogaster*, *Mystus Seenghala*, *M. cavasius*, *M. tengara*, *Callichrous pabola*, *C. bimaculatus* & *Wallago attu* etc.
2. Other aquatic Animals used as food:-
Prawns, Crabs, Lobsters & Oysters etc.
3. Structure of Mouth of different fishes in relation to feeding habits.
4. A study of the fish parasites.
5. A study of different types of Nets. Egg net, Cast net, Gill net, Drift net & Drag net.
6. A visit to lake / Reservoir/ fish breeding center/ Poultry.
7. Histology : Preparation of permanent histological slides of testes, Ovary, Kidney, intestine, liver of rat. (Microtomy)
8. Demonstration of detailed structures of DNA & RNA Through model.
9. Fish Feed formulation - Artificial
- Live-Culture, identify slide and preparation
10. Fish diseases- slides (infected fishes).
11. Biotechnological techniques.
12. Computer based experiments.

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