GUJARAT UNIVERSITY
CBCS BASED PROPOSED COURSE
ZOOLOGY

(Effective from June 2011)

SEMESTER – 2
103 (Theory)

(Mammalian Anatomy, Histology, Physiology, Non Chordate Animal Diversity, Cell Biology, Genetics, and Animal Biotechnology (Animal Cell Culture)

Unit 1 Blood Physiology:

1. Composition of Human blood **:**
   - i Blood Plasma -Water
     - Dissolved solids: Blood proteins, Supplies for the cells, Cellular products, Cellular waste-products.
     - Dissolved gases.
   - ii Blood cells **:**
     - a) RBC
       - Structure, Total count, Functions.
       - Composition (Hb only)
       - Effect of isotonic, hypotonic and hypertonic solutions.
       - Development &Life history (with flow-chart of figures)
       - Factors affecting Erythropoesis.
       - Anaemias:
       - General symptoms.
       - Types: Nutritional, Pernicious, Hemorrhagic, Hemolytic,
       - Aplastic and Sickle-cell (maxi. 5-6 sentences each)
     - b) WBC
       - Structure, Total count, Functions.
       - Classification (brief note for each WBC)
       - Development & Life history (only flow-chart without figures)
       - Brief concept of Leukemia (maxi. 5-6 sentences)
     - c) Platelets
       - Structure, Total count, Functions.
       - Development (only flow-chart with figures)

2. Blood coagulation
   - Brief introduction and significance.
   - Factors involved in blood coagulation.
   - Intrinsic & Extrinsic pathways of blood coagulation.
   - Concept of Intravascular blood clotting (Thrombosis)

3. Groups and Blood Types:
   - ABO Blood Group
   - Transfusions
   - Rh Blood Group
   - Typing and Cross-Matching Blood for Transfusion

Reference books for Mammalian Physiology & Histology and Anatomy:

1 .Principles of Anatomy & Physiology, Tortora and Grabowski, Harper Collins College Pub

2 Animal Physiology. And Related Biochem. H.R.Singh, Shobhan Lal Naginchand& Co. Edu. Pub., Jalandhar.

3. Textbook of Animal Histology. A.K.Berry, Emkay Pub, New Delhi.

Unit 2

(A) Cardiac anatomy.

1. Structure of human heart.
2. Layers of the heart wall
3. Brief study of coronary circulation
4. Origin, conduction and rate of heartbeat in humans.
5. Basic concept of cardiac cycle and ECG in humans.
6. Clinical connection : (Maximum 5-7 lines for each).
   - Cardiopulmonary resuscitation
   - Myocarditis and endocarditis
   - Heart valve disorders
   - Myocardial ischemia and infarction
   - Artificial pacemakers
   - Congestive heartfailure

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3. Textbook of Animal Histology. A.K.Berry, Emkay Pub, New Delhi.

(B) Non Chordate Animal Diversity :

Plasmodium (The Malarial Parasite)

- Systematic position
- Habits and habitat
- Life cycle of Plasmodium vivex
  (A) Asexual cycle of P.vivex in man
  (B) Sexual cycle of P.vivex in mosquito
- Pathogenicity
  (A) Effect on mosquito
  (B) Effect on man

Reference books for Animal Diversity of Nonchordates.

1 Textbook of Invertebrates, R.L. Kotpal, Rastogi publications, Meerut

2 Manual of Zoology, E.K.Ayer, Vol 1 & 2

3 Invertebrate Zoology, Jordan and Verma, S.Chand & Company, Delhi.

Unit 3 : Cytology

Cytology :

Ultrastructure & general functions of Golgi body:

- Morphology: Cisternae, Tubules, Vesicles, Golgian vacuoles.
- Zones of exclusion.
- General Brief introduction.
- functions.

a) Centrioles/Basal bodies –

- Brief introduction.
- Structure
- T.S. of centriole/basal body
- Chemical composition
- Origin of Centriole and Basal body
- T.S. of centriole/basal body
- General functions

c).Cilia and Flagella-

- Brief introduction.
- Distribution of Cilia and Flagella.
- Ultrastructure of Cilia and Flagella
- T.S. of cilium/flagellum ,L.S. of cilium and flagellum
- Chemical composition of Cilia and Flagella
- Functions of Cilia and Flagella.
- Derivatives of Cilia.

Reference Books for Cell Biology:

1. **Cytology**, P.S.Verma, S.Chand & Co, Ltd., New Delhi
2. **Cell Biology,** C.B.Powar, Himalaya Books Pub.
3. **Essentials of Cytology**, C.B.Powar, Himalaya Books Pub

- General functions.

Unit 4 Genetics and Animal Biotechnology

(A) Genetics

1. Complementary genes (e.g. Pea plant - Purple & White flowers)
2. Epistasis - Dominant (e.g. Dog), Recessive (e.g. Mice)
3. Sex-linked inheritance :
   - X-linked (e.g. colour blindness in man, eye-colour in *Drosophila*)
   - Y-linked (Holandric genes)
4. Sex-influenced inheritance :
   - Baldness in man

Referannce Book for Genetics

1.Genetics,P.K.Gupta,Rastogi Publications, Meerut.

2 Genetics,V.B.Rastogi,Kedarnath Ramnath,Meerut

(B) Animal Biotechnology (Animal cell culture)

1) Some more labs. facilities needed for setting up a tissue culture laboratory
2) Incubators
3) Centrifuges,
4) Laminar Airflows.
5) Introduction to Genetic Engineering in Zoology
6) Introduction to Nanotechnology in Zoology

Reference books:

1. Elements of Biotechnology, P.K.Gupta.Rastogi pub, Meerut

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104 (Practicals)

Physiology of blood :

a) Points for drawing blood by a syringe.
b) Preparations of human blood smear.
c) Determination of ABO blood grouping in humans.
d) Determination of blood clotting time.(BT,CT,PT)
e) Separation of plasma/serum from blood.

Cardiology: (Models / Charts / Photographs)

- Study of internal structure of the Heart.
- Antirior view of frontal section (To show the conductin of the heart)
- Location of pulse points in humans
- Determination of pulse rate in humans

Plasmodium :

- Study of life cycle of Plasmodium by chart
  1) In man, 2) In mosquito
- Study of signet ring stage in human blood

Cytology: (Charts / Photographs)

- T.S. Cilium and flagellum.
- L.S. Cilium and flagellum.
- T.S. Centriol and Basal Body.
- Golgibody- Zones of exclusion**.**

Genetics

A) Study of Genetics through charts (e.g. as per theory syllabus) :

- Complementary genes (e.g. Pea plant - Purple & White flowers)
- Epistasis - Dominant (e.g. Dog), Recessive (e.g. Mice)
- Sex-linked inheritance :
- X-linked (e.g. colour blindness in man, Haemophilia in man)
- Y-linked (Holandric genes)

a. Sex-influenced inheritance :
b. Baldness in man.

B) Genetics Problem

1. Two white flowered varities of pea plant when crossed produced purple flowered F_1 plants.
   Selfing of F_1 plants produced 112 progeny, 62 plants with purple flower and 50 with white flowers.
   a)What type of interaction is involved?
   b)Give a phenotype ratio approximated by the F_2 progeny.
   Solution-a) Complementary gene action, b)9:7 ratio

2. When dogs from a true breeding brown coatline were mated to dogs from a true breeding white coatline, all the F_1 progeny were white coat colour.
   Male and female mating of F_1 progeny produced F_2 progeny in the ratio of 130 white :35 black :11 brown. Explain these results
   Solution – 130:35: 11=12:3:1,Dominant epistasis.

3. Mating between two agouti Guinea pigs of the same genotype produced offsprings in the ratio of 45 agouti :15 black :19 albino.
   a) Give the approximate phenotype ratio of these offsprings.
   b) Give the type of interaction between the non-allelic genes responsible for the ratio calculated in (1).
   c) Give the genotype of the parents and offsprins.
   Solution-a) 9:3:4
   b)Supplementary gene interaction,recessive epistasis,
   c)CcAa CcAa

4. From a marriage, all the daughters are normal sighted whereas all the sons are colourblind.
   a)Give the genotype of the parents.
   b)If both the parents were colourblind, hildren. they give rise to norma children?
   Solution-a)Genotype of parents:Mother-XcXc-colourblind .
   Father-XY-Normal
   b)If both are colourblind, they cannot give rise to normal children

5. In man, haemophilia is sex-linked and recessive.
What offspring phenotype ratio would be expected from a marriage between :
a)A haemophilic man and carrier woman, and
b)A normal man and a carrier woman ?
Solution-a)Ratio in woman = Haemophilic : Carrier is 1 :1;
Ratio in man = Haemophilic : Normal is 1:1;
b)Ratio in woman = Carrier : Normal is 1 : 1;
Ratio in man= Haemophilic : Normal is 1: 1

6. Early baldness in man is due to an autosomal gene and is dominant in males.The homozygous recessive results in late baldness or non-baldness.The heterozygous persons marry and beget children.
a)What are the phenotype of the male and female children?
b)What will be the phenotypic ratio among the male children ?
c)What will be the phenotypic ratio among the female children ?
Solution-a) Bb Bb
b)Male children=Bald: Normal is 3 : 1;
c)Female children = Bald : Normal is 1:3

E Animal Biotechnology : (Instrument /chart /photograph)

a) Incubators

b) Centrifuges

c) Laminar Airflows
