KOLHAN UNIVERSITY

CHAIBASA

COURSE CURRICULUM FOR POST GRADUATE COURSES UNDER CHOICE BASED CREDIT SYSTEM

B.Sc. Zoology[General]

WITH EFFECT FROM 2017

Dr. S.B.Lal (Chairperson)

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EXAMINATION FRAMEWORK
FOR B.Sc [general]

ESUE

- There will be a uniform pattern of question for all course and of all the programs . the question pattern will be divided in to three groups .
- In which **GROUP - I** is objective type and is COMPULSORY .
- A total of **SEVEN** Question will be set in **group - B** out of which only **FOUR** questions to be attended Consisting of "**05**" marks each .
- In **GROUP - C** there will be a total of **FOUR** Question and only **TWO** shall have to be answered by the examinees carrying "**15**" marks each .

SIA

- Written Examination :- 15 Marks
- Co-curricular activities and Regularity :- 05 Marks
- Project Work / Seasonal Work / Field Study / Viva - Voce :- 10 Marks

GRADES AND GRADE POINTS

LATTER GRADE	GRADE POINT	MARKS PERCENTAGE
O(Outstanding)	10	100%
A++(Excellent)	9	90% to 99.99%
A+(Extremely Good)	8	80% to 89.99 %
A (VeryGood)	7.5	75% to 79.99 %
B+(Good)	7	70% to 74.99 %
B(AboveAverage)	6	60% to 69.99 %
C(Average)	5	50% to 59.99 %
P(Pass)	4	40 % to 49.99 %
F(Fail)	0	Less than 40%
Ab(Absent)	0	

CBCS SCHEME AND SYLLABUS UNDER

CHOICE BASED CREDIT SYSTEM

B.Sc. WITH ZOOLOGY

	CORE COURSE (12)	**Ability Enhancement Compulsory Courses AEC (2)**	**Skill Enhancement Courses SEC (4)**	**Discipline Specific Elective DSE (4)**
I	CC- Botany- I CC- Zoology- I CC- Chemistry- I	English/Mil Communication		
II	CC- Botany- II CC-Zoology -II CC- Chemistry- II	Environmental Science		
III	CC- Botany III CC-Zoology III CC- Chemistry III		SEC-I General Knowledge & Current Affires	
IV	CC- Botany- IV CC-Zoology -IV CC- Chemistry- IV		SEC-II Personality Development	
V			SEC-III History & Culture of Jharkhand	DSE-Botany- I DSE-Zoology- I DSE-Chemistry- I
VI			SEC-IV Value Education	DSE-Botany- II DSE-Zoology -II DSE-Chemistry -II

- **Discipline Core Courses: Zoology**

1. Animal Diversity
2. Comparative Anatomy and Developmental Biology of Vertebrates
3. Physiology and Biochemistry
4. Genetics and Evolutionary Biology

- **Discipline Specific Electives: Zoology (Any two)**

1. Applied Zoology
2. Animal Biotechnology
3. Immunology
4. Reproductive Biology

CORE COURSE - I
ANIMAL DIVERSITY
THEORY

UNIT :- 01 :-:- General characters and Classification up to orders of the following phyla .:-Protozoa , Porifera , Amphibian , Coelenterate , Annelids , Arthropods , Mollusca , Echindermata , Protochordata , Reptiles , Birds and Mammals .
UNIT :- 02 :-Life cycle of Paramecium , Locomotion and Osmoregulation in Protozoa .
UNIT :- 03 :- Canal System in Sycon .
UNIT :- 04 :- Polymorphism in Hydrozoa , Life Cycle obelia .
UNIT :- 05:- Life history of Ascaris lumbricoides .
UNIT :- 06:- Life history Taenia Solium , Fasciola Hepatica .
UNIT :- 07 :-Excretion in Annelida .
UNIT :- 08 :- Larval forms in Crustacea , Reproduction in Arthropoda .
UNIT :- 09 :-Torsion & detorsion in gastropods .
UNIT :- 10 :- General characters and classification up to classes ; water - vascular system in Asteroidea .
UNIT :- 11 :- General fearures and Phylogeny of Protochordata , Hemichordate , Urochordate , Cephalochordata .[Balanoglossus :- general account , Herdmania :- Retrogressive metamorphosis , Amphioxus :- affinities & general account]
UNIT :- 12 :- Parental Care in Amphibia .
UNIT :- 13:- Biting Mechanism in snakes ; Flight adaptation in Birds ; Origin & Evolution of Mammals .

CORE COURSE - I
ANIMAL DIVERSITY
PRACTICAL

01. Dissection of Animals :- [20]

Earthworm :- Digestive System & Nervous System , Prawn :- Alimentary Canal & Nervous System , Pila :-Nervous system.

02. SPOTTING :-[30]

a)Study of the following specimens & Slides :-

Plasmodium, Paramecium, Sycon, , Obelia, Physalia, Aurelia, Tubipora, Metridium, Taenia solium, Male and female *Ascaris lumbricoides, Aphrodite, Nereis, Pheretima, Hirudinaria, Palaemon, Cancer, Limulus, Palamnaeus, Scolopendra, Julus, Periplaneta, Apis, Chiton, Dentalium, Pila, Unio, Loligo, Sepia, Octopus, Pentaceros, Ophiura, Echinus, Cucumaria* and *Antedon, Balanoglossus, Herdmania, Branchiostoma, Petromyzon, Sphyrna, Pristis, Torpedo, Labeo, Exocoetus, Anguilla, Ichthyophis/Ureotyphlus, Salamandra, Bufo, Hyla, Chelone, Hemidactylus, Chamaeleon, Draco, Vipera, Naja, Crocodylus, Gavialis,* Any six common birds from different orders, *Sorex*, Bat, *Funambulus, Loris*

b)Study of the following permanent slides:

T.S. and L.S. of Sycon, , T.S. of Male and female Ascaris ,T.S of Earthworm .

03**. Key for Identification of poisonous and non-poisonous snakes , Collection & Preservation of Local Animal & their Description . [20]**

[An "animal album" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.]

4. **Record - 20**

5. Viva Voce - 10

CORE COURSE II
COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OF VERTEBRATES
THEORY

Unit 1: Integumentary System :-

Derivatives of integument w.r.t. glands and digital tips , Comparative anatomy of integument .

Unit 2: Circulatory System:-

Evolution of heart , Comparative anatomy of Heart , Comparative anatomy of Arotic Arches .

Unit 3: Respiratory System :-

Brief account of Gills & Swim bladder in fishes , air sacs in Birds . Physiology of Respiration .

Unit 4: Nervous System :-

Comparative account of brain , Nerve conduction [impulse]

Unit 5: Early Embryonic Development:-

Gametogenesis: Spermatogenesis and oogenesis w.r.t. mammals, vitellogenesis in birds; Fertilization: external (amphibians), internal (mammals), blocks to polyspermy; Early development of frog (structure of mature egg and its membranes, patterns of cleavage, fate map, up to formation of gastrula);types of morphogenetic movements; Fate of germ layers; Neurulation in frog embryo.

Unit 6: Late Embryonic Development :-

Implantation of embryo in humans, Formation of human placenta and functions, other types of placenta on the basis of histology;

COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OFVERTEBRATES
PRACTICAL

01. **Dissection of afferent & Efferent arterial system of Scolidon & Dissection of bony fishes and accessory respiratory organs . [20]**

02. Spotting . [20]

Osteology:- Disarticulated skeleton of fowl and rabbit , frog , Reptiles.

03. Frog - Study of developmental stages - whole mounts and sections through permanent slides – cleavage stages, blastula, gastrula, neurula, tail bud stage, tadpole external and internal gill stages. [**15]**

04. Study of the different types of placenta- histological sections through permanent slides or photomicrographs, Study of T.S of Gills of fishes , Accessory respiratory organs of Fishes . **[15]**

05. Record :- **[20]**

06. Viva - Voce **:-** **[10]**

SUGGESTED READINGS

- Kardong, K.V. (2005) *Vertebrates' Comparative Anatomy, Function and Evolution*. IV Edition. McGraw-Hill Higher Education.
- Kent, G.C. and Carr R.K. (2000). *Comparative Anatomy of the Vertebrates*. IX Edition. The McGraw-Hill Companies.
- Hilderbrand, M and Gaslow G.E. *Analysis of Vertebrate Structure*, John Wiley and Sons.
- Walter, H.E. and Sayles, L.P; *Biology of Vertebrates*, Khosla Publishing House.
- Gilbert, S. F. (2006). Developmental Biology, VIII Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.
- Balinsky, B.I. (2008). An introduction to Embryology, International Thomson Computer Press.

Carlson, Bruce M (1996). Patten's Foundations of Embryology, McGraw Hill, Inc

CORE COURSE III
PHYSIOLOGY AND BIOCHEMISTRY
THEORY

Unit 1: Nerve and muscle of Vertebrates :- Structure of a neuron, , Graded potential, Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres, Molecular and chemical basis of muscle contraction .

Unit :- 02 :- Digestion :- Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins, lipids .

Unit :-03 :- Respirtaion :- Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood in mammals .

Unit 4: Excretion :- Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism in mammals .

Unit 5: Cardiovascular system :- Composition of blood, Haemostasis, Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle in mammals .

Unit 6: Reproduction and Endocrine Glands :- hormonal control of menstrual cycle,Structure and function of pituitary, thyroid, Parathyroid, pancreas and adrenal in mammals .

Unit 7: Carbohydrate Metabolism :- Glycolysis, Krebs Cycle, Pentose phosphate pathway, Glycogen metabolism, Review of electron transport chain .

Unit 8: Lipid Metabolism :- Biosynthesis and β oxidation of palmitic acid .

Unit 9: Protein metabolism :- Transamination, Deamination and Urea Cycle .

PHYSIOLOGY AND BIOCHEMISTRY

PRACTICAL

1. Preparation of hemin and hemochromogen crystals , E.S.R & Haemotocytometer. [15]
2. Study of permanent histological sections in slides of mammalian pituitary, thyroid, pancreas, adrenal gland . and Study of permanent slides of spinal cord, duodenum, liver, lung, kidney, bone, cartilage [25]
3. Qualitative tests to identify functional groups of carbohydrates in given solutions (Glucose, Estimation of total protein in given solutions by Lowry's method.) [20]
4. Staining & preparation of Permanents slides. [20]
5. Record :- [10]
6. Viva - Voce :- [10]

SUGGESTED READINGS

- Tortora, G.J. and Derrickson, B.H. (2009). *Principles of Anatomy and Physiology*, XII Edition, John Wiley & Sons, Inc.
- Widmaier, E.P., Raff, H. and Strang, K.T. (2008) *Vander's Human Physiology*, XI Edition., McGraw Hill
- Guyton, A.C. and Hall, J.E. (2011). T*extbook of Medical Physiology*, XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company
- Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006). *Biochemistry*. VI Edition. W.H Freeman and Co.
- Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). *Principles of Biochemistry*. IV Edition. W.H. Freeman and Co.
- Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). *Harper's Illustrated Biochemistry*. XXVIII Edition. Lange Medical Books/Mc Graw3Hill.

CORE COURSE IV
GENETICS & EVOLUTIONARY BIOLOGY
THEORY

Unit 1: Introduction to Genetic Mendel's work on transmission of traits, Genetic Variation, Molecular basis of Genetic Information .

Unit 2: Mendelian Genetics and its Extension :- Principles of Inheritance, Chromosome theory of inheritance, Incomplete dominance and co-dominance, Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, sex linked inheritance, extra-chromosomal inheritance .

Unit 3: Linkage, Crossing Over and Chromosomal Mapping :- Linkage and crossing over, Recombination frequency as a measure of linkage intensity, two factor and three factor crosses, Interference and coincidence, Somatic cell genetics - an alternative approach to gene mapping .

Unit 4: Mutations :- Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy; Gene mutations: Induced versus Spontaneous mutations, Back versus Suppressor mutations.

Unit 5: Sex Determination :- Chromosomal mechanisms, dosage compensation .

Unit 6: Introduction to Evolutionary Theories:- Lamarckism, Darwinism, Neo-Darwinism.

Unit 7: Direct Evidences of Evolution :- Types of fossils, Incompleteness of fossil record, , Evolution of horse

GENETICS AND EVOLUTIONARY BIOLOGY

PRACTICAL

1. Study of Mendelian Inheritance and gene interactions (Non Mendelian Inheritance) using suitable examples. Verify the results using Chi-square test? [10]
2. Study of Linkage, recombination, gene mapping using the data ? [10]
3. Study of fossil evidences from plaster cast models and pictures .[10]
4. Study of homology and analogy from suitable specimens/ pictures[20]
5. Charts:
   a) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors. [10]
   b) Darwin's Finches with diagrams/ cut outs of beaks of different species . [15]
6. Visit to Natural History Museum and submission of report . or Drosophila salivary gland or Grashopper Testis . [15]
7. Viva - Voce :- [10]

SUGGESTED READINGS

- Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). *Principles of Genetics*. VIII Edition. Wiley India.
- Snustad, D.P., Simmons, M.J. (2009). *Principles of Genetics*. V Edition. John Wiley and Sons Inc.
- Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). *Concepts of Genetics*. X Edition. Benjamin Cummings.
- Russell, P. J. (2009). *Genetics- A Molecular Approach.* III Edition. Benjamin Cummings.
- Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. *Introduction to Genetic Analysis*. IX Edition. W. H. Freeman and Co.
- Ridley, M. (2004). *Evolution*. III Edition. Blackwell Publishing
- Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007). *Evolution*. Cold Spring, Harbour Laboratory Press.
- Hall, B. K. and Hallgrimsson, B. (2008). *Evolution*. IV Edition. Jones and Bartlett Publishers
- Campbell, N. A. and Reece J. B. (2011). *Biology*. IX Edition, Pearson, Benjamin, Cummings.
- Douglas, J. Futuyma (1997). *Evolutionary Biology*. Sinauer Associates.

DISCIPLINE CENTRIC ELECTIVE COURSES

DSE 1
ANIMAL BIOTECHNOLOGY

THEORY

Unit 1: Introduction **8**

Concept and scope of biotechnology

Unit 2: Molecular Techniques in Gene manipulation **24**

Cloning vectors: Plasmids, Cosmids, Phagemids, Lambda Bacteriophage, M13, BAC, YAC, MAC and Expression vectors (characteristics)

Restriction enzymes: Nomenclature, detailed study of Type II.

Transformation techniques: Calcium chloride method and electroporation.

Construction of genomic and cDNA libraries and screening by colony and plaque hybridization

Southern, Northern and Western blotting; DNA sequencing: Sanger method

Polymerase Chain Reaction, DNA Finger Printing and DNA micro array

Unit 3: Genetically Modified Organisms **18**

Production of cloned and transgenic animals: Nuclear Transplantation, Retroviral Method, DNA microinjection

Applications of transgenic animals: Production of pharmaceuticals, production of donor organs, knockout mice.

Production of transgenic plants: *Agrobacterium* mediated transformation.

Applications of transgenic plants: insect and herbicide resistant plants.

Unit 4: Culture Techniques and Applications **10**

Animal cell culture, Expressing cloned genes in mammalian cells, Molecular diagnosis of genetic diseases (Cystic fibrosis, Sickle cell anemia.Recombinant DNA in medicines: Recombinant insulin and human growth hormone, Gene therapy

ANIMAL BIOTECHNOLOGY

PRACTICAL

1. Genomic DNA isolation from *E. coli*
2. Plasmid DNA isolation (pUC 18/19) from *E. coli*
3. Restriction digestion of plasmid DNA.
4. Construction of circular and linear restriction map from the data provided.
5. Calculation of transformation efficiency from the data provided.
6. To study following techniques through photographs
   a) Southern Blotting
   b) Northern Blotting
   c) Western Blotting
   d) DNA Sequencing (Sanger's Method)
   e) PCR
   f) DNA fingerprinting
7. Project report on animal cell culture

SUGGESTED READINGS

- Brown, T.A. (1998). *Molecular Biology Labfax II: Gene Cloning and DNA Analysis*. II Edition, Academic Press, California, USA.
- Glick, B.R. and Pasternak, J.J. (2009). *Molecular Biotechnology - Principles and Applications of Recombinant DNA*. IV Edition, ASM press, Washington, USA.
- Griffiths, A.J.F., J.H. Miller, Suzuki, D.T., Lewontin, R.C. and Gelbart, W.M. (2009). *An Introduction to Genetic Analysis*. IX Edition. Freeman and Co., N.Y., USA.
- Snustad, D.P. and Simmons, M.J. (2009). *Principles of Genetics.* V Edition, John Wiley and Sons Inc.
- Watson, J.D., Myers, R.M., Caudy, A. and Witkowski, J.K. (2007). *Recombinant DNA- Genes and Genomes- A Short Course*. III Edition, Freeman and Co., N.Y., USA.
- Beauchamp, T.I. and Childress, J.F. (2008). *Principles of Biomedical Ethics.* VI Edition, Oxford University Press.

DSE - 2 , APPLIED ZOOLOGY ,THEORY

Unit 1: Introduction to Host-parasite Relationship **3**

Host, Definitive host, Intermediate host, Parasitism, Symbiosis, Commensalism, Reservoir, Zoonosis

Unit 2: Epidemiology of Diseases **7**

Transmission, Prevention and control of diseases: Tuberculosis, typhoid

Unit 3: Parasitic Protozoa **8**

Life history and pathogenicity of *Entamoeba histolytica*, *Plasmodium vivax* and *Trypanosoma gambiense*

Unit 4: Parasitic Helminthes **5**

Life history and pathogenicity of *Ancylostoma duodenale* and *Wuchereria bancrofti*

Unit 5: Insects of Economic Importance **8**

Biology, Control and damage caused by *Helicoverpa armigera*, *Pyrilla perpusilla* and *Papilio demoleus, Callosobruchus chinensis*, *Sitophilus oryzae* and *Tribolium castaneum*

Unit 6: Insects of Medical Importance **8**

Medical importance and control of *Pediculus humanus corporis*, *Anopheles, Culex, Aedes, Xenopsylla cheopis*

Unit 7: Animal Husbandry **5**

Preservation and artificial insemination in cattle; Induction of early puberty and synchronization of estrus in cattle

Unit 8: Poultry Farming **5**

Principles of poultry breeding, Management of breeding stock and broilers, Processing and preservation of eggs

Unit 09: Fish Technology **5**

Genetic improvements in aquaculture industry; Induced breeding and transportation of fish seed

DSE - 2 , APPLIED ZOOLOGY

PRACTICAL

1. Study of *Plasmodium vivax*, *Entamoeba histolytica*, *Trypanosoma gambiense*, *Ancylostoma duodenale* and *Wuchereria bancrofti* and their life stages through permanent slides/photomicrographs or specimens.
2. Study of arthropod vectors associated with human diseases: *Pediculus*, *Culex*, *Anopheles*, *Aedes* and *Xenopsylla*.
3. Study of insect damage to different plant parts/stored grains through damaged products/photographs.
4. Identifying feature and economic importance of *Helicoverpa* (*Heliothis*) *armigera*, *Papilio demoleus*, *Pyrilla perpusilla*, *Callosobruchus chinensis*, *Sitophilus oryzae* and *Tribolium castaneum*
5. Visit to poultry farm or animal breeding centre. Submission of visit report
6. Maintenance of freshwater aquarium

SUGGESTED READINGS

- Park, K. (2007). *Preventive and Social Medicine*. XVI Edition. B.B Publishers.
- Arora, D. R and Arora, B. (2001). *Medical Parasitology*. II Edition. CBS Publications and Distributors.
- Kumar and Corton. *Pathological Basis of Diseases*.
- Atwal, A.S. (1986). *Agricultural Pests of India and South East Asia*, Kalyani Publishers.
- Dennis, H. (2009). *Agricultural Entomology.* Timber Press (OR).
- Hafez, E. S. E. (1962). *Reproduction in Farm Animals*. Lea & Fabiger Publisher
- Dunham R.A. (2004). *Aquaculture and Fisheries Biotechnology Genetic Approache*s. CABI publications, U.K.
- Pedigo, L.P. (2002). *Entomology and Pest Management*, Prentice Hall.

DSE :- 03 , IMMUNOLOGY

UNIT-1 . Introduction to Immunity

UNIT-2. Cell and organs of immune system

2.1 Types of immune cells, lymphoid and myeloid
2.2 Primary and secondary lymphoid organs .

UNIT-3. Humoral immunity

3.1 Antigen
3.2. Function of B cell

UNIT- 4. Cell mediated immunity

4 .1.Function of T-Cells

UNIT - 5 :- Antibodies :- Structure , classes and function of antibodies , monoclonal antibodies , antigen antibody interaction as tools for research and diagnosis .

UNIT - 06 :- Working of the immune system :- Structure and function of MHC , exogenous and endogenous pathways of antigen presentation and processing , Basic properties and function of Cytokines , Complement ststem : Components and pathways .

UNIT :- 07 ;- Vaccines ;- General introduction to vaccines , various types of vaccines .

DSE :- 03 , IMMUNOLOGY

PRACTICAL

1*. Demonstration of lymphoid organs
2. Histological study of spleen, thymus and lymph nodes through slides/ photographs
3. Preparation of stained blood film to study various types of blood cells.
4. Ouchterlony's double immuno-diffusion method.
5. ABO blood group determination.
6*. Cell counting and viability test from splenocytes of farm bred animals/cell lines.
7. Demonstration of
   a) ELISA
   b) Immunoelectrophoresis

(*Subject to UGC guidelines)

SUGGESTED READINGS

- Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J (2006). *Immunology*, VI Edition. W.H. Freeman and Company.
- David, M., Jonathan, B., David, R. B. and Ivan R. (2006). *Immunology*, VII Edition, Mosby, Elsevier Publication.
- Abbas, K. Abul and Lechtman H. Andrew (2003.) *Cellular and Molecular Immunology*. V Edition. Saunders Publication.

DSE 4

REPRODUCTIVE BIOLOGY

THEORY

Unit 1: Reproductive Endocrinology

Gonadal hormones and mechanism of hormone action, steroids, glycoprotein hormones, and prostaglandins, hypothalamo – hypophyseal – gonadal axis, regulation of gonadotrophin secretion in male and female; Reproductive System: Development and differentiation of gonads, genital ducts, external genitalia, mechanism of sex differentiation.

Unit 2: Functional anatomy of male reproduction

Outline and histological of male reproductive system in rat and human; Testis: Cellular functions, germ cell, system cell renewal; Spermatogenesis: kinetics and hormonal regulation; Androgen synthesis and metabolism; Epididymal function and sperm maturation; Accessory glands functions; Sperm transportation in male tract

Unit 3: Functional anatomy of female reproduction

Outline and histological of female reproductive system in rat and human; Ovary: folliculogenesis, ovulation, corpus luteum formation and regression; Steroidogenesis and secretion of ovarian hormones; Reproductive cycles (rat and human) and their regulation, changes in the female tract; Ovum transport in the fallopian tubes; Sperm transport in the female tract, fertilization; Hormonal control of implantation; Hormonal regulation of gestation, pregnancy diagnosis, foeto – maternal relationship; Mechanism of parturition and its hormonal regulation; Lactation and its regulation

Unit 4: Reproductive Health

Infertility in male and female: causes, diagnosis and management; Assisted Reproductive Technology: sex selection, sperm banks, frozen embryos, in vitro fertilization, ET, EFT, IUT, ZIFT, GIFT, ICSI, PROST; Modern contraceptive technologies; Demographic terminology used in family planning

REPRODUCTIVE BIOLOGY

PRACTICAL

1. Study of animal house: set up and maintenance of animal house, breeding techniques, care of normal and experimental animals.
2. Examination of vaginal smear rats from live animals.
3. Surgical techniques: principles of surgery in endocrinology. Ovarectomy, hysterectorny, castration and vasectomy in rats.
4. Examination of histological sections from photomicrographs/ permanent slides of rat/human: testis, epididymis and accessory glands of male reproductive systems; Sections of ovary, fallopian tube, uterus (proliferative and secretory stages), cervix and vagina.
5. Human vaginal exfoliate cytology.
6. Sperm count and sperm motility in rat
7. Study of modern contraceptive devices

SUGGESTED READINGS

- Austin, C.R. and Short, R.V. reproduction in Mammals. Cambridge University Press.
- Degroot, L.J. and Jameson, J.L. (eds). Endocrinology. W.B. Saunders and Company.
- Knobil, E. et al. (eds). The Physiology of Reproduction. Raven Press Ltd.
- Hatcher, R.A. et al. The Essentials of Contraceptive Technology. Population Information Programme.

Thanku....