



**Rajarshi Shahu Mahavidyalaya,
Latur. (Autonomous)**

Syllabus

**B. Sc. S.Y.
ZOOLOGY**

(Third and Fourth Semester)

Semester Pattern

W.e.f. 2018-19

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR.**(Autonomous)****SEMESTER PATTERN CURRICULUM UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)**

Faculty of Science

B.Sc. S.Y. Under Graduate (UG) Programmes

SUBJECT: ZOOLOGY

(w. e. f. June -2018)

Semester	Course Number	Paper No. and Title	Total period/week	Marks		Credits	
				Internal ESE	External CA		
SEM-III	CCZ-III	A	Animal Physiology and Immunology	45 3/week	20	30	2
		B	Genetics	45 3/week	20	30	2
	CCZP-III	A	Animal Physiology and Immunology	45 3/week	20	30	2
	CCZP-IV	B	Genetics	45 3/week	20	30	2
	SECZ-I		Clinical Haematology	3/Week	20	30	2
SEM-IV	CCZ-IV	A	Biochemistry	45 3/week	20	30	2
		B	Molecular Biology and Genetic Engineering	45 3/week	20	30	2
	CCZP-V	A	Biochemistry	45 3/week	20	30	2
	CCZP-IV	B	Molecular Biology and Genetic Engineering	45 3/week	20	30	2
	SECZ-II		Microtechniques	3/Week	20	30	2

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B.Sc. S.Y. Under Graduate (UG) Programmes
SUBJECT: ZOOLOGY
Animal Physiology and Immunology CCZ-III-A
(w. e. f. June -2018)

Learning Objectives

- To make the students to understand the physiological process of animals
- To understand the importance of physiology and Immunology
- To understand concepts and different types of immunity.
- To have basic knowledge of functions of different organs and organ system
- To introduce the concepts of physiology of digestion excretion and Osmoregulation
- To introduce the concepts of physiology of respiration and circulation

Course Outcome

- Learners would understand the different physiological process of animals
 - Learners would be able to correlate the habit and habitat with nutritional, excretory and osmoregulatory structures
 - Learners would be able describe the concepts and different types of immunity.
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Unit - I

1) Digestion Physiology

- i) Intracellular and Extracellular digestion
- ii) Mechanical process in digestion
- iii) Chemical process of digestion
- iv) Absorption of food

2) Respiration physiology

- i) External and Internal respiration
- ii) Respiratory organs of man
- iii) Mechanism of respiration
- iv) O₂ and Co₂ transportation
- v) Control of respiration and Respiratory quotient

Unit -II

1) Circulation physiology

- i) Open and closed type of circulation
- ii) Circulatory organs (Heart and Blood vessels)
- iii) Typical pattern of circulation
- iv) Composition and function of blood
- v) Level of blood Cholesterol, urea and sugar.
- vi) Erythropoiesis and Its regulation
- vii) Blood pressure, ECG, Heart beat and Cardiac cycle.
- viii) Lymphatic system (Lymph, Lymph vessels and Lymph node)

Unit -III

1) Excretion physiology

- i) Mode up of Excretion
- ii) Structure of nephron (Urineriferous tubule)
- iii) Physiology of Urine formation Composition of urine and Osmoregulation

2) Neurophysiology

- i) Structure of Neuron
- ii) Structure of Synapse and reflex action
- iii) Conduction of nerve impulses and Neurotransmitter

UNIT:-IV

1) Muscle physiology

- i) Structure and types of muscles and Ultra structure of skeletal muscle fibre
- iv) Sliding filament theory

2) Reproductive Physiology

- i) Hormonal control of testicular and ovarian functions ,menstrual cycle, estrous cycle, and Homeostasis.

3) Immunology

- i) Types of Immunity ii) The immune system
- iii) Immune response (Antigen, Antibody, Humoral and cell mediated immunity)

Reference Books

- 1) A textbook of Animal Physiology – K.A. Goel and K.V. Shastri (Rastogi Pub.)
- 2) A textbook of Practical Physiology – V.G. Ranade (P.V.G. Prakashan Pune.)
- 3) Clinical Pathology and Haematology – Nanda Baheti (Kanhaiya Pub.)
- 4) Comparative animal physiology C. Ladd Prosser.
- 5) Expiermental Physiology – S.C. Rastogi (Wiley Eastern Ltd. London)
- 6) Human Physiology Vander A.J., Sherman J.H. and Luciano D.S. (McGraw Hill London) Medical laboratory Techniques – Ramni Sood, Jaypee Brothers medical Pub. Pvt. Ltd. New Delhi.
- 7) Text book of animal Physiology – A.K. Berry (Emkay Pub. Delhi)
- 8) Animal Physiology – A. Mariakuttikan N. Arumugam (Saras Publication)
- 9) Principles of animal Physiology – Wood D.W
- 10) Physiology – Guyton and Hall
- 12)Duby-Immunology (W.H. Freeman)
- 13)Shastri\N.V. - Principles of Immunology
- 14)Lal S.S. and Kumar Sanjeev - Immunology

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SUBJECT: ZOOLOGY
Genetics CCZ-III-B
(w. e. f. June -2018)

Learning Objectives:

1. To make the students to understand the structure and functions of gene
2. To understand the importance of Genetics
3. To have basic knowledge of mutation
4. To understand the inheritance pattern.

Course Outcome

1. Understand and apply the principles of inheritance.
 2. Understand the concept of multiple alleles, linkage and crossing over.
 3. Learner able to introduce the concept of sex determination and its types, sex 4. Influenced and sex limited genes.
 5. Learners would understand mechanisms of sex determination.
 6. Learners would be able to correlate the disorders linked to a particular sex chromosome.
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Unit –I (Mendelian genetics and Modifications)

- i) Mendelism
- ii) Monohybrid cross and Dihybrid cross
- iii) Interaction of gene (9:3:4, 9:7, 13:3, 15:1)
- iv) Incomplete dominance.
- v) Back cross and test cross.

Unit – II (Multiple Alleles and Multiple Gene)

- i) Multiple alleles – Eg. Coat colour in Rabbit .and ABO Blood groups in Man.
- ii) Rh factor and Erythroblastosis foetalis in man.
- iii) Multiple genes - Eg. Skin colour in Man.
- iv) Linkage – definition, Types and significance
- v) Crossing over –Mechanism, Factor affecting on crossing over, and Its Significance

Unit – III (Sex determination, sex linked inheritance and Gene Mutations)

- i) Chromosomal methods of sex determination.
- ii) Bridge's ratio theory of genic balance.
- iii) Sex linked inheritance in Drosophila.
- iv) Sex linked inheritance in man – colorblindness, haemophilia, Hypertrichosis and baldness.
- v) Chromosomal Mutations – Structural and numerical mutations
- vi) Mutagenic agents
- vii) sickle cell anemia.

Unit – IV (Human genetics)

- i) Syndromes – Turner's, Klinefelter's, Down's, Cat – Cry, Patau's, and Edwards.
- ii) Inborn errors of metabolism – Phenylketonuria (PKU), Alkaptonura, Albinism. iii) Human Pedigree analysis with Symbols used

- iii) Eugenics
- iv) Euphenics

Reference Books

1. Verma P.S. and V. K. Agarwal (2008) Cell biology, Genetics, molecular Biology, Evolutionary Ecology, S. Chand & Co. New Delhi
2. Singh, B. D. (2002) Biotechnology,
3. Bhamrah, H. S. and Kavita Juneja. "Molecular cell Biology", Anmol publications Pvt. Ltd.
4. Gupta, P.K. (1996) "Genetics" Rastogi Publications.
5. Ranga, M.M. "Animal Biotechnology (Agrobios), Published by Agrobios (India).
6. Rastogi, Sharma, V.N. and Anuradha Tandon (1993). "Concepts in Molecular Biology". Wiley Eastern Ltd. N. Delhi.
7. Smustad, Simmons, Jenkins (1999). "Principles of Genetics" John Wiley and sons. Inc.
8. Daniel Fairbanks, W. Ralph Anderson. "Genetics, the Continuity of Life" (1999). Brooks/Cole Publishing Company, New York.
- 9) Genetics – P.K. Gupta (Rastogi pub. Meerut)
- 10) Genetics – Verma P.S. and Agarwal V.K. (S. Chand pub. Delhi.)
- 11) Genetics – Winchester (Oxford LBH Pub.)
- 12) Genetics and Evolution – A.P. Jha (Macmillon India)
- 13) Concepts of genetics – W.S. Clug (Pearson Education ISBN)
- 14) Genetics – Strickberger (Prentice – Hall)
- 15) Principle of genetics – R.H. Tamarin (Tata Mc Graw Hill Pub. India)
- 16) Concepts of Genetics – R. L. Kotpal (Rastogi Pub.)
- 17) Genetics and Genetic Engineering – Dr. R.P. Meyyan (Saras Pub.)
- 18) Foundations of Genetics – Pai A.C. (Mc Graw Hill Pu b.)
- 19) Molecular Genetics – Gunther, S. Stent, (Macmillon)
- 20) Principles of Genetcs – Sinnott, Dunn and Dobzansky (Tata McGraw Hill Pub. Delhi).
- 21) Genetics – M.P. Arora (Himalaya).
- 22) Genetics and Evolution – N. Armugam (Saras Pub.)
- 23) Genetic – Veer Bala (Rastogi Pub.)

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SUBJECT: ZOOLOGY
Animal Physiology and Immunology CCZP-III-A
(w. e. f. June -2018)

PRACTICALS

Learning Objectives

- To make the students to understand the haematological and immunological techniques.
- To make the students to understand the haematological techniques conducted in laboratories including, complete blood count, blood grouping, blood films, differential count.
- To make the students to understand the process of digestion by qualitative detection of digestive enzymes.
- To make the students to understand the analytical techniques know the functional status of different organ.

Course Outcome

- Learners would understand the different physiological process of animals
 - Learners would be able to understand functional status of organ
 - Learners would be able to understand complete blood count, blood grouping, blood films, differential count.
 - Learners would understand the respiratory status of animals
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Physiology

1. Qualitative detection of digestive enzymes (protease, Amylase and Lipase) in cockroach/ Crab.
2. Detection of human salivary amylase.
3. Estimation of oxygen consumption in fish/ Crab or any other suitable aquatic animal.
4. R.B.C. Counting.
5. W.B.C. counting.
6. Differential leucocyte count of blood.
7. Measurement of blood pressure by sphygmomanometer.
8. Estimation of Haemoglobin.
9. Estimation of urine / serum creatinine from blood
10. Estimation of urine / serum urea by diacetyl monoxime method
11. Colorimetric estimation of blood/serum cholesterol.
12. ESR of blood.
13. Determination of clotting time of blood by capillary tube method.
14. Estimation of glucose by Benedict quantitative method.
15. Determination of bilirubin in serum
16. Qualitative detection of Nitrogenous waste products (Ammonia, Urea)

Uric acid) in birds excreta and urine of Mammals.

17. Preparation of Haematin crystals.

18. Structure of synapse, structure of neurons (slide/ chart)

19. Types of nerves – Unipolar, Bipolar, Multipolar.
(slides)

20. Quantitative estimation of Na, K, Ca and Phosphorus

21. Calculate the respiratory quotient

22. Calculate the basal metabolic rate Calculation of the daily energy expenditure from tables

23. Calculation of Metabolism during physical work, oxygen debt and efficiency of work

25. Paper electrophoresis of serum proteins

26. Gel electrophoresis of serum proteins

27. Separation of protein by SDA-PAGE

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SUBJECT: ZOOLOGY
Genetics CCZP-IV-B
(w. e. f. June -2018)

Learning Objectives:

1. To make the students to understand the Mendel's Laws of inheritance.
2. To understand the importance modification in Mendelian laws like complementary factor to Blood group.
3. To understand the problems based on sex linked inheritance.
4. To understand the chromosomal abnormalities.

Course Outcome

1. Learner will be able to do the problems based Mendel's laws.
 2. Understand and apply the concept of multiple alleles, linkage and crossing over.
 3. Learner able to do the problems based on sex linked inheritance and blood groups etc.
 5. Learners would understand mechanisms of sex determination.
 6. Learners would be able to understand the Human pedigree analysis and symbols.
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PRACTICALS

- 1) Problems based on monohybrid and dihybrid cross (Explain with the help of plastic beads.)
- 2) Problems on modification in ratio due to interaction of genes— complementary factors, supplementary factors, inhibitory factors, duplicate genes (explain with the help of plastic beads).
- 3) Problems on blood group inheritance in man.
- 4) Problems based on sex linked inheritance
- 5) Culture of Drosophila and observation of genetic characters in Drosophila (eye & wings)
- 6) Preparation of temporary slides of salivary gland chromosomes from chironomous larva.
- 7) Study of slide of sickle cell anemia.
- 8) Study of chromosomes abnormalities in man, Down's syndrome, Klinefelter Syndrome, Turner Syndrome with the help of Photograph/ Charts/ Karyotype.
- 9) Drosophila culture techniques.
- 10) Study of phenotypic characters in Drosophila (Body colour, Wing pattern and Eye colour).
11. Buccal smear – Identification of Barr Body
12. Human pedigree analysis- Various symbols used and problems

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SUBJECT: ZOOLOGY
Clinical Haematology
Skill Enhancement Course SECZ-I
(w. e. f. June -2018)

UNIT – I

1. The components of blood

- Plasma
- Red blood cells
- White blood cells
- Platelets

2. Collection of Blood

- Criteria for sample collection
- Collection of capillary blood (Peripheral Blood) blood by skin punctures
- Collection of venous blood by Venipuncture,
- Collection of arterial blood,

3. Practical:

- Collection Blood by Skin puncture and Venipuncture.
- Separation of Blood components Plasma, Serum and Corpuscles

UNIT – II

1. Haemoglobin

- Structure and function of Haemoglobin

2. Anemia Causes, Effect and Control

- Types of anemia
- Causes and Symptoms of anemia
- Control measure of anemia
- Diagnosis of anemia

3. Practical

- Estimation of Haemoglobin

UNIT – III.

1. Haemopoiesis, erythropoiesis and leucopoiesis

2. Practical: Complete Blood Count (CBC)

- RBC Counting
- WBC Counting
- Platelet count and Hamatocrit

UNIT – IV

- Blood Clotting,
- Mechanism of Clotting

- Extrinsic and Intrinsic Mechanism
 - Blood cholesterol and Urea and Creatin
- 3. Practical:** Clotting and bleeding time of blood.

REFERENCE BOOKS:

1. Medical Laboratory Technology - Ramnik Sood
2. Medical Lab Technology Vol. I, II & III – Kanai Mukherjee
3. Hand Book of Medical Technology - Mrs. Chitra
4. Medical Laboratory Technology – A. Ananthanarayan
5. Manual for Laboratory Technician of Primary Health by Minister of Health
6. Human Physiology Vol. I & II – C. C. Chatterjee

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SUBJECT: ZOOLOGY
Biochemistry CCZP-V-A
(w. e. f. June -2018)

Learning Objectives:

1. To make the students to understand chemistry of life
2. To understand the importance of Biochemistry
3. To have basic knowledge of metabolism
4. To give learner insight into the structure of biomolecules, and their role in sustenance of life.

Course Outcome:

1. The learner will realize the importance of biomolecules and their clinical significance.
 2. Able to demonstrate an understanding of fundamental biochemical principles, such as the structure/function of biomolecules, metabolic pathways, and the regulation of biological/biochemical processes.
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Unit-I (Classification, Structural properties and biological functions)

- i) Introduction of Biochemistry
- ii) Carbohydrates and lipids
- iii) Proteins and Amino acids and peptides,

Unit-II (Classification, Structural properties and biological functions)

- i) Vitamins (Discovery, types and their functional Significance.)
 - a) Fat soluble (A, D, E, K, Q and U)
 - b) Water soluble (B-complex family and Ascorbic Acid)
- ii) Antioxidants

Unit-III (Enzymology)

- i) Nomenclature of enzyme and chemistry of enzymes
- ii) Classification, properties of enzyme
- iii) Mechanism and factor affecting on enzyme action
- iv) Enzyme inhibition and Biological function of enzymes
- v) Coenzymes

Unit-VI (Metabolism)

- i) Metabolism of Carbohydrates
(EMP, HMP pathway, Krebs cycle, Glycogenosis, Glyconeogenesis, Glycogenolysis.)
- ii) Metabolism of lipid
(Beta oxidation pathway, Ketogenesis, ketolysis, ketosis)
- iii) Metabolism of protein
(Oxidation of amino acids. Urea cycle, Transamination Deamination)
- iv) Biochemistry of Hormones

Reference Books

- 1) Lehninger Principles of Biochemistry
-David L. Nelson, Michael M. Cox,
Macmillan Worth Publishers.
- 2) Harper's Biochemistry-Rober K. Murray, Daryl K. Grammer, McGraw Hill,
LangeMedical Books. 25thedition.
- 3) Fundamentals of Biochemistry-J.L. Jain, Sunjay Jain, Nitin Jain, S. Chand & Company.
- 4) Biochemistry-Dr. Amit Krishna De, S. Chand & Co., Ltd.
- 5) Biochemistry-Dr. Ambika Shanmugam, Published by Author.
- 6) Biomolecules-C.Kannan , MJP Publishers,Chennai-5.
- 7) Laboratory manual in Biochemistry -Jayaraman.
- 8) Biochemical methods -S.Sadasivan and Manickam.
- 9) Introduction to Practical Biochemistry -David T. Plummer.

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SUBJECT: ZOOLOGY
Molecular Biology and Genetic Engineering CCZ-V-B
(w. e. f. June -2018)

Objectives:

1. To make the students to understand biological tools for research
2. To understand the importance of Molecular Biology and Genetic Engineering
3. To have basic knowledge of cloning and Gene Expression

Course Outcome:

1. Students will able to use biological tools for research.
 2. Learner will able to describe the importance of Molecular Biology and Genetic Engineering.
 3. Learner will able to use vectors in cloning techniques and rDNA technology
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UNIT- I

- i) Introduction to Molecular Biology
- ii) Deoxyribonucleic acid (Structure, properties, function, and type of DNA)
- iii) Ribonucleic acid (Structure and types)
- iv) Replication and genetic code

UNIT- II

- i) Protein synthesis
- ii) Gene concept and molecular structure of gene
- iii) Types of gene and Discontinuous genes (Exons and Introns)
- iv) Gene Expression in prokaryotes (Lac operon) eukaryotes
- v) One gene one enzyme hypothesis and one polypeptide hypothesis

UNIT- III

1. Introduction to genetic engineering-Mendel's to Molecules
2. Tools; - a) Enzymes: - i. lysing ii. Ligases
- iii Nucleases { Exonucleases, Endonucleases., Restriction Endonucleases enzymes }
- iv. Syntheses { DNA polymerase, Reverse transcriptase }
- b) Vectors:- Cloning vectors [plasmid -pBR322, Bacteriophage-Lambda phage, Viruses-SV40, Cosmids vectors] and Expression vectors { Shuttle vector }
3. Techniques: - a) Southern, Northern and Western blotting b) PCR (Polymerase chain reaction)
4. DNA Sequencing(Sanger)

UNIT- IV

1. Gene cloning
2. Linking of desired gene with vector DNA
3. Introduction of recombinant DNA into host Cell
4. Identification of recombinant DNA
5. c-DNA libraries and Genomic libraries
6. Transgenesis and Transgenic animals [Transgenic cattle, sheep, pig and fish]
7. Animal cloning and cloned animals [Dolly sheep]
8. DNA fingerprinting

Reference Books

- 1.Molecular Biology –David Friefelder –Narosa Publishing House, New Delhi.
- 2.Cell Biology, Genetics, Molecular Biology, Evolution & Ecology –Verma, Agarwal –S. Chand& Co.
- 3.Molecular & Cell Biology –Bhamrah –Anmol Publ. Pvt. Ltd., New Delhi.
- 4.Molecular Biology of the Cell –Alberts, Bray, Lewis, Raff, Roberts, Watson –Garland Publishers, New York.
- 5.Molecular Biology of the gene –J. D. Watson, NH Hopkins, Roberts, Stertz, Weiner-Freeman.
- 6.Concepts in Biotechnology –Editors-Balasubramanian, Bryee, Dharmalingam, Green, Jayraman – Sangam Books.
- 7.Molecular Biology of the Gene –Watson, Hopkins, Roberts, Steitz, Weiner –Benjamin Cummings Publishing Co.
- 8.Molecular Cell Biology –Baltimore, Zipursky, Matsudaria, Darnel –W. H. Freeman & Co., New York.
- 9.Outlines of Biochemistry –Conn & Stumpf.
- 10.Principles of Biochemistry –White, Handler, Smith –McGraw Hill Publ.
- 11.Cell & Molecular Biology –Phillip Sheller –Wiley Publ.
12. Molecular Biology -Robert F. Wiver

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Biochemistry CCZP-V-A
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They should standardize their solutions individually.

1. To make the students to understand the skills necessary to analyze chemicals and chemical reactions quantitatively and qualitatively;
2. To make the students to understand the skills necessary to verify hypothesis.
3. To make the students to understand skills of titrimetric, Colorimetric Iodometric analysis of vitamins, amino acid.

Course Outcome:

1. Learners would understand the qualitative and quantitative analytical skill of biomolecule.
 2. Learners would understand skills of titrimetric ,colorimetric ,Iodometric analysis of biomolecule.
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1. EXPERIMENT INVOLVING TITRIMETRIC PROCEDURES

a. Estimation of amino acids by formal titration.

B. Estimation of ascorbic acid by titrimetric method using 2, 6-dichlorophenol indophenol.

c. Estimation of Antioxidant by ,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay

d. Estimation of reducing sugar from biological fluids by Benedict's titrimetric method.

2. QUALITATIVE ANALYSIS.

A. Reactions of simple sugars including glucose, fructose, galactose, mannose, pentose, maltose, sucrose, lactose, starch, glycogen and dextrin.

b. Reactions of proteins -solubility, Biuret, Millon's xanthoproteic test, denaturation by heat, pH change and precipitation by acidic reagents. Color reactions of amino acids like tryptophan, tyrosine, cystine, methionine, arginine, proline and histidine.

c. Reactions of lipids -solubility, saponification tests for unsaturations, Liebermann Burchard test for Cholesterol.

3. COLORIMETRIC ESTIMATION

1. Estimation of Protein by Biuret method/Bradford method/Lowry

2. Estimation of amino acids by ninhydrin method

3. Estimation of hemoglobin cyanmethemoglobin method

4. Isolation of glycogen from liver source and its estimation by anthrone method

5. Estimation of Lipids

6) Estimation of creatinine by Jaffe's method.

7) Estimation of urea by Diacetyl Monoxime method.

8) Estimation of glucose by O -Toluidine method/ Folin-Wu method.

9) Estimation of cholesterol by Zak's method.

10) Extraction of DNA by Phenol and Chloroform Method

11) Extraction of RNA by Trizol Method

12) To measure concentration/ Quantification of DNA & RNA by UV spectrophotometry

13. Estimation of DNA and RNA using DPA and Orcinol reagent respectively
 14. Isolation and separation of protein by Gel electrophoresis
4. EXPERIMENTS ON ENZYMES BY COLORIMETRY

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SUBJECT: ZOOLOGY
Molecular Biology And Genetic engineering CCZP-V-B
(w. e. f. June -2018)

Objective

1. To make the students to understand knowledge restriction digestion and r-DNA.
2. To understand the applications of Molecular Biology and Genetic Engineering
3. To have basic knowledge of cloning and Gene Expression, gene transfer, Blotting techniques, Equipments used in genetic etc.

Course Outcome:

1. Learners will able to understand the blotting technique.
 2. **Learner will be able to use the agarose gel electrophoresis for DNA molecular size determination and will be able to estimate the DNA and RNA.**
 3. Learner will able to understand the vectors in cloning techniques and rDNA technology.
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PRACTICALS

1. Transformation in E.coli DH5-/JM-105
 2. Bacterial conjugation
 3. Phage Titration
 4. Plasmid preparation
 5. Demonstration of restriction digestion
 6. Ligation
 7. Genomic DNA extraction
 8. DNA molecular size determination
 9. Bacterial Antibiotic sensitivity
 10. Bacterial gene expression (using Lac promoter system)
 11. **Analysis of Gene Expression**
- 1. Screening & Analysis:**
- a) GFP Cloning (Gene cloning)
 - b) Bacterial Gene Expression
 - c) Southern Hybridization
- 2. PCR Application:** Single Nucleotide Polymorphism (SNP)
- 3. DNA Fingerprinting:**
- a) DNA Fingerprinting (Using RAPD techniques)
- Demonstration of isolation of plasmid by alkaline lysis method. 12. Demonstration of isolation of genomic DNA. 13. Demonstration of Southern / western blotting.

14. Demonstration of replica plating technique.

15. Demonstration of restriction digestion

16. Identification of Lac⁺ bacteria by blue white screening using IPTG

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SUBJECT: ZOOLOGY
Microtechnique
Skill Enhancement Course SECZ-II
(w. e. f. June -2018)

UNIT - I

1. Introduction – Definition of Histotechnology
2. Methods of examination of tissues and cells, Collection and labeling of specimens, Methods of preparation and examination of tissues (fresh and fixed tissue)

UNIT - II

3. Fixation of tissue - Definition, Criteria for an ideal fixative, types (Simple and Compound), Properties of Simple and Compounds fixatives (Microanatomical, cytological and histochemical)

Practical – Isolation and collection of tissue, fixing and block preparation.

UNIT - III

4. Tissue processing - Manual and automatic tissue processing, Different embedding media, Steps of tissue processing (Dehydration, Clearing, Impregnation).
5. Embedding- Methods of Embedding, Embedding medium, names of medium and moulds, Automatic Tissue Processes (Structure and Working, Advantages and Disadvantages).

Practical – Tissue processing of prepared blocks.

UNIT - IV

6. Section Cutting - Types of Microtome, Rotary Microtome -Parts and their functions, Microtome Knives- Types, Care and Maintenance Techniques of sharpening; Technique of Section Cutting, Preparation of Adhesive Mixture, Mounting.
7. Staining - Definition and Significance of Staining, Stain and Staining Types, Theory of Staining, Methods of Staining.
Practical – Section Cutting, fixing, alcohol grading, staining and preparation of permanent slide.

REFERENCE BOOKS:

1. Histochemical Techniques – J. D. Bancroft.
2. Handbook of Histopathological and Histochemical Techniques - C.F.A. Culling.
3. Histological and Histochemical Methods 4th Edition – John Kiernan.

