UNIVERSITY OF GOUR BANGA

Undergraduate Syllabus for Zoology (Minor)
(Based on NEP-2020)

(As per Curriculum and Credit Framework for Undergraduate Programs i.e. FYUGP or Four Years Undergraduate Programs)

UG syllabus for ZOOLOGY (Minor)
(SEMESTER V-VIII)
(Based on NEP-2020)

Semester	Paper	Course Code	Title of the Course	Credits	Full Marks
I	Minor-1	ZOO-IDC/DC-MN-101	Biology of Non-Chordates (Theory)	04	30+25*
			Biology of Non-Chordates (Practical)		20
II	Minor-2	ZOO-IDC/DC-MN-201	Biology of Chordates (Theory)	04	30+25*
			Biology of Chordates Practical)		20
III	Minor-3	ZOO-IDC/DC-MN-301	Ecology and Evolutionary Biology (Theory)	04	30+25*
			Ecology and Evolutionary Biology (Practical)		20
IV	Minor-4	ZOO-IDC/DC-MN-401	Cell biology and Genetics (Theory)	04	30+25*
			Cell biology and Genetics (Practical)		20
V	Minor-5	ZOO-IDC/DC-MN-501	Physiology and Biochemistry (Theory)	04	30+25*
			Physiology and Biochemistry (Practical)		20
VI	Minor-6	ZOO-IDC/DC-MN-601	Developmental and Reproductive Biology (Theory)	04	30+25*
			Developmental and Reproductive Biology (Practical)		20
VII	Minor-7	ZOO-IDC/DC-MN-701	Parasitology and Immunology (Theory)	04	30+25*
			Parasitology and Immunology (Practical)		20
VIII	Minor-8	ZOO-IDC/DC-MN-801	Molecular Biology and Biotechnology (Theory)	04	30+25*
			Molecular Biology and Biotechnology (Practical)		20
25* Marks for Internal Assessment					

Scheme for Evaluation

For End Semester (Theory) Examination related to Disciplinary Minor Courses: The Question pattern with marks allotment for each End Semester (Theory) Examination of Full Marks 30 and Time: 2 hours is tabulated below:

Question No.	Mark(s) per Question	No. of Questions to be attempted	No. of Options to be provided	Marks
1	1	6	8	1x6=6
2	3	3	5	3x3=9
3	5	3	5	5x3=15
Total Marks				**30**

SEMESTER - V

Curriculum of Disciplinary Minor Course (Zoology) for UG Program	
Course Code:	**ZOO-IDC/DC-MN-501**
Title of the Course:	**Physiology and Biochemistry**
Semester = V	
Credit = 4	

(Theory: 30 marks, Practical: 20 marks, Internal Assessment: 25 marks)

a) Objective of the Course:

To provide students with a foundational understanding of human physiology, the basic principles of the endocrine system, and the fundamental biochemical processes that underpin these systems. Upon completion of this course, students will be able to describe the major functional systems of the human body, explain the roles and regulation of key hormones, and outline the basic metabolic pathways of carbohydrates, lipids, and proteins.

b) Learning Outcomes of the Course and Its Future Relevance:

Upon successful completion of this course, students will be able to:

- Explain the fundamental physiological processes occurring within the major organ systems of the human body, including digestion, nerve and muscle function, respiration, renal function, and cardiovascular function.
- Outline the basic structure and function of the major endocrine glands and articulate the roles of their key hormones in regulating physiological processes.
- Compare and contrast the mechanisms by which steroidal and non-steroidal hormones exert their effects on target cells.
- Describe the structures of key biomolecules (carbohydrates, lipids, and proteins) and explain the major metabolic pathways involved in their synthesis and breakdown.
- Relate the structure and function of enzymes to their role in catalyzing biochemical reactions.

Knowledge of human physiology and biochemistry is essential for careers in medicine, pharmacy, and allied health sciences. In an era of rapid advancements in medical technology, personalized medicine, and our understanding of the human body at the molecular level, a solid foundation in human physiology and biochemistry remains indispensable. Basic biochemical and hormonal knowledge is critical for drug development, diagnostics, and therapeutic design. This course equips students with the fundamental knowledge necessary to engage with these advancements and contribute meaningfully to various scientific and healthcare-related fields. Moreover, essential for success in exams like NET, GATE, and other entrance tests in life sciences.

ZOO-IDC/DC-MN-501(Theory = 30 Marks)	
Physiology and Biochemistry	
Module 1: Human Physiology and Functional Systems	
Unit-1	**Digestion and Absorption of Food**
	Digestion and absorption of carbohydrates, fats and proteins.
Unit-2	**Functioning of Excitable Tissue (Nerve and Muscle)**
	Structure of neuron, Propagation of nerve impulse (myelinated and non-myelinated nerve fibre); structure of skeletal muscle, Mechanism of muscle contraction, Neuromuscular junction, Synaptic transmission.
Unit-3	**Respiratory Physiology**
	Ventilation, external and internal respiration, transport of oxygen and carbon dioxide in blood.
Unit-4	**Renal Physiology**
	Functional anatomy of kidney, Mechanism of urine formation.
Unit-5	**Cardiovascular Physiology**
	Structure of heart, Coordination of heart beat.
Module 2: Basic concepts of Endocrine system	
Unit-6	**Introduction to Endocrinology**

	General idea of endocrine systems, Structure of endocrine glands (pituitary, thyroid, pancreas, adrenal, ovaries and testes) and role of hormones secreted by these glands. Classification, characteristic and transport of hormones.
Unit -7	**Regulation of Hormone Action**
	Mechanism of action of steroidal, Non-steroidal hormones with receptors.
Module 3: Fundamentals of Biochemistry	
Unit -8	**Carbohydrates**
	Structure of: monosaccharides, disaccharides, polysaccharides. Carbohydrate metabolism: glycolysis, citric acid cycle, glycogenesis and glycogenolysis.
Unit- 9	**Lipids**
	Structure and significance: physiologically important saturated and unsaturated fatty acids, tri-acylglycerols, phospholipids, sphingolipid, glycolipids, steroids. Lipid metabolism: β-oxidation of fatty acids.
Unit -10	**Proteins**
	Classification, Secondary structures. Protein metabolism: Transamination, Deamination, Urea cycle.
Unit- 11	**Enzymes**
	Nomenclature and classification; Mechanism of enzyme action.
Module 4: ZOO-IDC/DC-MN-501 (Practical = 20 Marks)	
Group A: Laboratory experimentation (= 15 marks)	
i. Preparation of temporary mounts: Blood film. ii. Estimation of haemoglobin using Sahli's haemoglobinometer. iii. Examination of permanent histological sections of mammalian liver, duodenum, lung, kidney, thyroid, pancreas, adrenal, testis, ovary and pituitary. iv. Qualitative tests: proteins, functional groups in carbohydrates. v. Estimation of total protein in given solutions by Lowry's method. vi. Study of activity of salivary amylase under optimum conditions.	
Group: B: Laboratory note book and Viva voce (3+2=5marks)	

Periodically updated laboratory note-book to be submitted and Viva-voce mostly covering the practical syllabus.
ZOO-IDC/DC-MN-501: Internal Assessment (Full marks = 25*) **(*To be conducted by the Concerned College)**

Suggested readings

1. Animal Physiology by Richard Hill, Gordon A. Wyse, Margaret Anderson.
2. Eckert's Animal Physiology by Roger Eckert, D.J. Randall, Warren Burggren, Kathleen French, Warren W. Burggren.
3. Animal Physiology: From Genes to Organisms by Sherwood.
4. Animal Physiology Adaptation and Environment by Schmidt-Nielsen.
5. Principles of Animal Physiology by Christopher D. Moyes, Patricia M. Schulte.
6. Human Physiology by Stuart Ira Fox, Krista Rompolski.
7. Human Physiology by Gillian Pocock, Christopher D. Richards, David A. Richards.
8. Ganong's Review of Medical Physiology by Kim E. Barrett, Susan M. Barman, Scott Boitano, Heddwen L. Brooks.
9. Guyton and Hall Textbook of Medical Physiology by John E. Hall.
10. Endocrinology by Hadley.
11. Greenspan's Basic and Clinical Endocrinology by David G. Gardner, Dolores M. Shoback.
12. Harper's Illustrated Biochemistry by Peter J. Kennelly, Kathleen M. Botham, Owen McGuinness, Victor W. Rodwell, P. Anthony Weil.
13. Biochemistry by Jeremy Berg, Gatto Jr. Gregory, Hines Justin, Tymoczko John, Stryer Lubert.
14. Lehninger Principles of Biochemistry by David L. Nelson, Michael Cox.
15. Biochemistry by Voet and Voet.

SEMESTER-VI

Curriculum of Disciplinary Minor Course (Zoology) for UG Program	
Course Code:	**ZOO-IDC/DC-MN-601**
Title of the Course:	**Developmental and Reproductive Biology**
Semester = VI	
Credit = 4	

(Theory: 30 marks, Practical: 20 marks, Internal Assessment: 25 marks)

a) Objective of the Course:

To provide students with a comprehensive understanding of the fundamental principles of developmental biology and reproductive physiology, covering both male and female systems. The course aims to explore the sequential stages of embryonic development, the hormonal and physiological regulation of reproduction, and the clinical and technological advancements in reproductive healthcare. By integrating basic concepts with applied knowledge, the course prepares students to critically analyze issues related to fertility, reproductive health, and family planning strategies.

b) Learning Outcomes of the Course and Its Future Relevance:

Upon successful completion of this course, students will be able to:

- Describe the key stages of gametogenesis, fertilization, and early embryonic development, including cleavage, blastulation, and gastrulation, across different model organisms.
- Explain the fundamental processes that control development, such as gene activation, determination, induction, differentiation, morphogenesis, intercellular communication, cell movements, and programmed cell death.
- Outline the developmental processes involved in the formation of the brain and eye in vertebrates.
- Explain the roles of gonadal hormones and the regulation of gonadotrophin secretion in both males and females. Detail the structure and histology of the male and female reproductive systems in humans and explain the cellular functions within the gonads.

- Explain the processes of spermatogenesis, oogenesis, folliculogenesis, ovulation, and the formation and regression of the corpus luteum.
- Describe the human reproductive cycles and the hormonal mechanisms that regulate them.
- Analyze the various causes of infertility in males and females and discuss current diagnostic and management strategies.
- Explain the principles and applications of Assisted Reproductive Technologies (ART) and discuss their ethical and societal implications. Describe different modern contraceptive technologies and understand demographic terminology used in family planning.

This course provides a fundamental understanding of the processes that govern the creation and development of life. Moreover, Foundational for careers in gynecology, obstetrics, reproductive endocrinology, and fertility counseling. As scientific knowledge and technological capabilities continue to advance, the principles and concepts learned in this course will remain highly relevant and essential for addressing some of the most pressing challenges and opportunities in biology, medicine, and society. Also, valuable for national-level exams and postgraduate programs in biology, medicine, and life sciences.

ZOO-IDC/DC-MN-601(Theory = 30 Marks)	
Developmental and Reproductive Biology	
Module 1: Foundations of Developmental Biology	
Unit-1	**Gametogenesis & Fertilization**
	Spermatogenesis, Oogenesis, Types of eggs, Egg membranes, Fertilization in Sea urchin, Blocks to polyspermy.
Unit-2	**Embryonic Development**
	Planes and patterns of cleavage, role of yolk in cleavage, Types of blastula, Early development of chick up to gastrulation. Fate of germ layers, Extra-embryonic membranes in birds, Placenta (structure, types and functions).
Unit-3	**Post Embryonic Development**
	Development of brain and eye in chick.

Unit-4	**Control of Development**
	Fundamental processes in development (brief idea) – Gene activation, Determination, Induction, Differentiation, Morphogenesis, Intercellular communication, Cell movements and Cell death.
Module 2: Understanding Reproductive Physiology	
Unit- 5	**Reproductive Endocrinology**
	Gonadal hormones, regulation of gonadotrophin secretion in male and female; Reproductive System: Development and differentiation of gonads.
Unit -6	**Functional anatomy of male reproduction**
	Outline study of male reproductive system in human; Histology of Testis, Hormonal regulation of spermatogenesis.
Unit- 7	**Functional anatomy of female reproduction**
	Outline study of female reproductive system in human; Histology of Ovary; Ovarian hormones; Reproductive cycles (human) and their hormonal regulation.
Module 3: Modern Reproductive Biology and Reproductive Health	
Unit- 8	**In vitro Fertilization and Reproductive Health**
	Infertility in male and female: causes, diagnosis, and management Brief idea of Assisted Reproductive Technology (ART): Sex selection, Sperm banks, Frozen embryos, In vitro fertilization (IVF), Embryo Transfer (ET), Embryo Freezing and Transfer (EFT), Intrauterine Transfer (IUT), Zygote Intra Fallopian Transfer (ZIFT), Gamete Intra Fallopian Transfer (GIFT).
Unit- 9	**Contraception and Family Planning**
	Modern contraceptive technologies Demographic terminology used in family planning
Module 4:ZOO-IDC/DC-MN-601(Practical = 20 Marks)	
Group A: Laboratory experimentation (= 15 marks)	

i. **Identification** of whole mounts of developmental stages of chick through permanent slides: 24, 48, 72, and 96 hours of incubation. ii. **Study** of the different types of placenta- histological sections through permanent slides or photo-micrographs. iii. **Study** of live gametes from white rat/ study of gametes from photomicrographs. iv. Examination of histological sections from permanent slides of mammalian ovary and testis. v. **Study on life-cycle:** Project report on *Drosophila* culture/chick embryo development. vi. **Study of animal house**: Set up and maintenance of animal house, breeding techniques, care of normal and experimental animals.
Group: B: Laboratory note book and Viva voce (3+2=5marks)
Periodically updated laboratory note-book to be submitted and Viva-voce mostly covering the practical syllabus.
ZOO-IDC/DC-MN-601: Internal Assessment (Full marks = 25*) **(*To be conducted by the Concerned College)**

Suggested readings

1. Developmental Biology by Michael J.F. Barresi, Scott F. Gilbert.
2. Principles of Development by Lewis Wolpert, Rosa Beddington, Thomas Jessell, Peter Lawrence, Elliot Meyerowitz, Jim Smith.
3. Analysis of Biological Development by Klaus Kalthoff.
4. Langman's Medical Embryology by Sabita Mishra (Author), T. W. Sadler.
5. An Introduction to Embryology by B. I. Balinsky.
6. Yen and Jaffes Reproductive Endocrinology Physiology Pathophysiology and Clinical Management by Jerome F. Strauss III, Robert L. Barbieri.

SEMESTER - VII

Curriculum of Disciplinary Minor Course (Zoology) for UG Program	
Course Code:	**ZOO-IDC/DC-MN-701**
Title of the Course:	**Parasitology and Immunology**
Semester = VII	
Credit = 4	

(Theory: 30 marks, Practical: 20 marks, Internal Assessment: 25 marks)

a) Objective of the Course:

To equip students with a foundational understanding of parasitology, including the biology of parasites, host-parasite interactions, disease transmission, and control measures, with emphasis on medically important protozoan and helminthic parasites. The course also introduces students to the principles of immunology, covering the structure and function of the immune system, mechanisms of immunity, and practical applications such as vaccination and immunization programs. This integrated approach aims to develop a strong conceptual and practical framework for understanding infectious diseases and host defense mechanisms.

b) Learning Outcomes of the Course and Its Future Relevance:

Students will be able to:

- Categorize different types of parasites and describe their unique adaptations for a parasitic lifestyle. Explain the diverse ways parasites interact with their hosts and the factors influencing these relationships.
- Detail the life cycles, mechanisms of disease causation, and strategies for controlling significant protozoan (*Entamoeba histolytica*, *Plasmodium vivax*, *Trypanosoma gambiense*) and helminthic (*Taenia solium*, *Ancylostoma duodenale*, *Wuchereria bancrofti*) parasites prevalent in our region and globally.
- Explain the transmission pathways, diagnostic approaches, and preventive measures for important zoonotic parasitic infections like *Toxocara* and *Schistosoma*.

- Describe the significance of vectors, particularly mosquitoes, in the spread of various parasitic and other infectious diseases common in India.
- Understand the transmission dynamics, identify key symptoms, and outline effective prevention strategies for diseases like malaria, dengue, tuberculosis, and typhoid, which are significant public health concerns in West Bengal and India.
- Identify and explain the functions of primary and secondary lymphoid organs and the different types of immune cells. Compare and contrast the mechanisms and components of the innate and adaptive immune responses.
- Describe the concepts of antigenicity and immunogenicity, the types of B and T cells, and the structure and classes of immunoglobulins.
- Explain the function of the Major Histocompatibility Complex (MHC), the role of cytokines, the basics of the complement system, and the fundamental principles of hypersensitivity reactions.
- Explain the principles of vaccination, differentiate between active and passive immunization, and understand the significance of the National Immunization Policy in the Indian context.

This course provides highly relevant knowledge and skills that are crucial for addressing the ongoing and emerging challenges of parasitic and infectious diseases in India. Essential for careers in medicine, microbiology, public health, pathology, and diagnostic laboratory sciences. Graduates will be well-equipped to contribute to healthcare, research, public health initiatives, and the development of innovative solutions to improve the health and well-being of the population.

ZOO-IDC/DC-MN-701(Theory = 30 Marks)	
Parasitology and Immunology	
Module 1: Principles of Parasitology	
Unit-1	**Parasites and Hosts**
	Types of parasites, parasitism and parasitic adaptations; host types and host-parasite interactions.

Unit-2	**Protozoan Parasites**
	Life cycle, pathogenicity and control of *Entamoeba histolytica*, *Plasmodium vivax*, and *Trypanosoma gambiense*.
Unit-3	**Helminthic Parasites**
	Life cycle, pathogenicity and control of *Taenia solium*, *Ancylostoma duodenale*, *Wuchereria bancrofti*.
Unit-4	**Zoonotic Infections**
	Toxocara and *Schistosoma* infections: transmission, diagnosis, prevention.
Module 2: Applied and Medical Parasitology	
Unit-5	**Vector Biology and Disease Transmission**
	Role of mosquito and house fly as disease vectors.
Unit-6	**Epidemiology and Disease Control**
	Transmission, symptoms and prevention of dengue, tuberculosis, typhoid.
Module 3: Foundations of Immunology	
Unit-7	**Cells and Organs of the Immune System**
	Overview of immune system, immune cells, primary and secondary lymphoid organs.
Unit-8	**Types of Immunity**
	Innate vs Adaptive immunity; Humoral vs Cell mediated immunity.
Unit-9	**Antigens and Antibodies**
	Antigenicity vs immunogenicity; B and T cell types; Basic structure of Immunoglobulin, General idea of different classes of immunoglobulin.
Unit-10	**Key Immune Mechanisms**
	Major Histocompatibility Complex (MHC); Basic functions of complement system and cytokines, Basic idea of hypersensitivity (types I–IV).
Unit-11	**Applied Immunology**
	Basics of vaccination; active and passive immunization; National immunization policy.
Module 4: ZOO-IDC/DC-MN-701(Practical = 20 Marks)	
Group A: Laboratory experimentation (= 15 marks)	

i. Study of rectal parasites of *Periplaneta* sp. ii. Identification of different mosquitoes through specimen / photographs. iii. Preparation of stained blood film to study various types of blood cells. iv. ABO blood group determination. v. Demonstration of Dot ELISA/ELISA techniques. vi. Ouchterlony's double immuno-diffusion method. vii. Demonstration of Immunoelectrophoresis. viii. Demonstration of lymphoid organs of rat/ mice. ix. Identification of slides of spleen, thymus and lymph nodes /through photographs.
Group: B: Laboratory note book and Viva voce (3+2=5marks)
Periodically updated laboratory note-book to be submitted and Viva-voce mostly covering the practical syllabus.
ZOO-IDC/DC-MN-701: Internal Assessment (Full marks = 25*) **(*To be conducted by the Concerned College)**

Suggested readings

1. Paniker's Textbook of Medical Parasitology by Sougata Ghosh.
2. Textbook of Medical Parasitology: Protozoology & Helminthology by Subhash Chandra Parija.
3. PARASITOLOGY: A Conceptual Approach by Bruce V. Hofkin, Eric S. Loker.
4. Human Parasitology by Burton J. Bogitsh, Clint E. Carter, Thomas N. Oeltmann.
5. A Textbook of Immunology, Microbiology & Parasitology by Amit Arora.
6. General Parasitology by Thomas C. Cheng.
7. Basic Immunology Functions and Disorders of The Immune System by Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai.
8. Kuby Immunology by Jenni Punt, Sharon Stranford, Patricia Jones, Judith A Owen.
9. Cellular and Molecular Immunology Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai.

SEMESTER - VIII

Curriculum of Disciplinary Minor Course (Zoology) for UG Program	
Course Code:	**ZOO-IDC/DC-MN-801**
Title of the Course:	**Molecular Biology and Biotechnology**
Semester = VIII	
Credit = 4	

(Theory: 30 marks, Practical: 20 marks, Internal Assessment: 25 marks)

a) Objective of the Course:

To provide students with a comprehensive understanding of the molecular basis of genetic function and regulation, along with the tools and techniques of genetic engineering and biotechnology. The course aims to build foundational knowledge on the structure and function of nucleic acids, mechanisms of gene expression, and recombinant DNA technology. It will help in understanding the applications of biotechnology in various fields, including human welfare and cancer biology. Through this integrative approach, students will be prepared to explore research, innovation, and applied solutions in health, agriculture, and industry.

b) Learning Outcomes of the Course and Its Future Relevance:

Students will be able to:

- Describe the structure and properties of DNA and RNA and articulate the fundamental processes of replication, transcription, and translation in prokaryotes.
- Explain the mechanisms of gene regulation, including the *lac* operon, and understand the basic principles of epigenetics.
- Describe the key enzymes and vectors used in genetic engineering and explain the steps involved in gene cloning and library construction.
- Explain the principles and applications of DNA fingerprinting, PCR, and various blotting techniques (Southern, Northern, Western). Describe the techniques of animal cell and organ culture and explain the properties and potential applications of stem cells and cryopreservation.

- Explain how biotechnology contributes to improving human health and addressing societal challenges. Describe how molecular biology and biotechnology are used to understand, diagnose, and potentially treat cancer.

  Molecular Biology and Biotechnology course provides a highly relevant and future-oriented education. Graduates will acquire the fundamental knowledge and skills necessary to contribute to the burgeoning biotechnology sector, advance healthcare, improve agriculture, and drive innovation in India.

ZOO-IDC/DC-MN-801(Theory = 30 Marks)	
Molecular Biology and Biotechnology	
Module 1: Fundamentals of Molecular Biology	
Unit-1	Structure and Properties of Nucleic Acids
Unit-2	Nucleic Acids as Genetic Material
Unit-3	Mechanisms of Replication, Transcription, and Translation in Prokaryotes
Unit-4	Regulation of Gene Expression: *lac* operon, Role of epigenetics
Module 2: Genetic Engineering and Gene Manipulation	
Unit-5	Introduction to Genetic Engineering and Recombinant DNA Technology
Unit-6	Enzymes in Genetic Engineering: Restriction Endonucleases and Ligases
Unit-7	Cloning Vectors: Plasmids, YACs
Unit-8	DNA Fingerprinting and Its Applications
Module 3: Biotechnology: Principles and Applications	
Unit-9	Concept and Scope of Biotechnology
Unit-10	Animal Cell Culture Technique
Unit-11	Stem Cells and Cryopreservation
Unit-12	Molecular Techniques: Basic idea of PCR and Blotting (Southern, Northern, Western)
Unit-13	Biotechnology in Human Welfare and Cancer Biology
Module 4: ZOO-IDC/DC-MN-801(Practical = 20 Marks)	

Group A: Laboratory experimentation (= 15 marks)
i. Genomic DNA isolation from *E. coli*. **ii.** Plasmid DNA isolation (pUC 18/19) from *E. coli*. **iii.** Restriction digestion of plasmid DNA. **iv.** To study following techniques through photographs: (i) Southern Blotting, (ii) Northern Blotting, (iii) Western Blotting, (iv) PCR, (v) DNA fingerprinting. **v.** Designing of PCR primers. **vi.** Seminar on tools and techniques of Biotechnology and submission of report.
Group: B: Laboratory note book and Viva voce (3+2=5marks)
Periodically updated laboratory note-book to be submitted and Viva-voce mostly covering the practical syllabus.
ZOO-IDC/DC-MN-801: Internal Assessment (Full marks = 25*) **(*To be conducted by the Concerned College)**

Suggested readings

1. Molecular Biology by David P. Clark (Author), Nanette J. Pazdernik (Author), Michelle R. McGehee.
2. Molecular Biology of the Gene by James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine.
3. Molecular Biology: Genes to Proteins by Burton E. Tropp.
4. Molecular Biology: Principles of Genome Function by Nancy Craig, Rachel Green, Carol Greider, Gisela Storz, Cynthia Wolberger, Orna Cohen-Fix.
5. Molecular Biology: Principles and Practice by Michael M. Cox, Michael O'Donnell, Jennifer Doudna.
6. Molecular Biology Structure and Dynamics of Genomes and Proteomes by Jordanka Zlatanova, Kensal E. Van Holde.
7. Fundamental Molecular Biology by Lizabeth A. Allison.
8. Molecular Biotechnology: Principles and Applications of Recombinant by Bernard R. Glick, Cheryl L. Patten.
9. Gene Cloning and DNA Analysis: An Introduction by Brown T. A.
10. Principles Of Gene Manipulation and Genomics by Primrose S.B.