

Teaching Plan Year 2021

Name of the faculty member: Dr Pervaize Ahmad

Designation: Assistant Professor

Department: Zoology

Subject: Zoology

Semester: 6th

Subject /Title Code: Immunology

S. no.	Unit	Topics Covered	No. of Lectures	Subtopics/Lectures	Pedagogical aid
1	I	1. Introduction to basic concepts in immunology	03	Introduction A historical Perspective of Immunology Concept of Immunity	
		2. Components of Immune System	05		
		3. Principles of Innate and Adaptive immune system	10	Innate immunity First line of defence Physical barrier Chemical barriers Second line of defence Phagocytosis, Endocytosis Inflammation Acquired/ adaptive immunity Characteristics of Immune response Humoral immunity Cell mediated immunity	
		4. Cells and organs of immune system	05	Lymphatic Organs Primary Lymphoid Organs	

				THYMUS GLAND BURSA OF FABRICIUS AND BONE MARROW Secondary Lymphoid Organs THE SPLEEN LYMPH NODES	
		5. Haematopoiesis	03	Process of Haematopoiesis Formation of Myeloid lineage cells Formation of Lymphoid lineage cells	
2	II	6. Basic properties of antigen	03	Concept and Basic properties of antigen Classes of antigen	
		7. B and T cell epitopes, haptens and Adjuvants	06	Epitopes Characteristics of Epitopes recognised by B Cells Characteristics of Epitopes recognised by C cells Haptens Adjuvants	
		8. Structures, classes and Types of Antibodies	05	Structure of immunoglobulin (IgG) IgM and its functions IgD and its functions IgE and Its functions IgA and its functions	
		9. Monoclonal Antibodies	03	Concept of monoclonal antibodies Production of monoclonal antibodies Advantages and limitations	

		10. Antigen antibody interactions	03	Antigen antibody interaction Neutralization, Agglutination Precipitation, opsonisation Cross reactivity	
3.	III	11. MHC genes and their products	03	Concept of MHC genes Classes of MHC genes Pattern of expression of MHC genes	
		12. MHC antigens	04	MHC antigens Structure of MHC I antigen Structure of MHC II antigens Functions of MHC antigens	
		13. Antigen processing and presentation	04	Concept of antigen processing and presentation Exogenous processing and presentation of antigen Endogenous processing and presentation of antigen and	
		14. Cytokines	04	Basic concept of cytokines Classes and nomenclature Basic properties of cytokines Biological functions of cytokines	
		15. Complement system	05	Concept of complement system Complement pathways Classical pathways Alternative pathway Lectin pathway Functions of complement system	
4.	IV	16. Hypersensitivity	05	Concept of hypersensitivity	

				Classification of hypersensitivity Type I hypersensitivity Type II hypersensitivity Type III hypersensitivity Type IV hypersensitivity	
		17. Immunodeficiency	06	Immunodeficiency Causes of immunodeficiency Classes of immunodeficiency Combined immunodeficiency SCID Clinical presentation of SCID Diagnosis and treatment	
		18. Autoimmune diseases	06	Autoimmune diseases Categories of autoimmune disease Organ specific autoimmune diseases Systemic autoimmune diseases LEPUS Arthritis	
		19. Vaccines	04	Concept of vaccination Types of vaccines Working of vaccines National immunization and VPDS	

Teaching Plan Year 2021

Name of the faculty member: Dr Pervaize Ahmad

Designation: Assistant Professor

Department: Zoology

Subject: Zoology

Semester: 5th

Subject /Title Code: Animal Biotechnology

S. no.	Unit	Topics Covered	No. of Lectures	Subtopics/Lectures	Pedagogical aid
1	I	20. Concept and Scope of Biotechnology	03	Introduction Concept Scope and Importance	
		21. Cloning Vectors	05	Concept of Vectors Cloning vectors Plasmid Phagemid Cosmid Vectors Bacteriophage	
		22. Expression Vectors	02	Expression vectors Characteristics	
		23. Restriction Enzymes	04	Concept of Restriction enzymes Types of RE Nomenclature of RE Type II RE in Detail	
		24. Transformation Techniques	03	Concept of Transformation and Methods Calcium Chloride Method Electroporation	
2	II	25. DNA Libraries	05	Concept of DNA libraries Construction of Genomic Libraries Construction of cDNA libraries Screening of DNA libraries by Colony hybridization Screening by plaque hybridization	

		26. Blotting techniques	08	Concept and importance of Blotting Southern Blotting Concept and principle Procedure of SB Application of SB Northern Blotting Concept and principle Procedure of NB and Application of NB Western Blotting Concept and principle Procedure of WB and Application of WB	
		27. DNA Sequencing	02	Concept of Sequencing Sangers Method of Sequencing	
		28. Polymerase Chain Reaction	03	Concept and Mechanism Principle and Procedure Applications of PCR	
		29. DNA Finger Printing	02	Concept, Principle and Procedure Applications	
		30. DNA Micro array	02	Concept and procedure Applications	
3.	III	31. Production of Cloned and transgenic animals	05	Concept of cloning Concept of transgenic animals Formation of transgenic animals by nuclear transplantation Formation of transgenic animals by nuclear transplantation Retroviral method	

				DNA microinjection	
		32. Transgenic Animals	06	Mice Cattle Sheep Goat Birds fish	
		33. Applications of transgenic Animals	02	Common applications of transgenic animals	
		34. Production of pharmaceuticals	02	Targeted Production of Pharmaceutical Proteins Insulin and Growth hormone Drugs or Molecular Pharming	
		35. Production of Donar organs	02	Donar organs Production of Organs for Xenotransplantation	
		36. Knockout mice	02	Concept and uses of Knockout mice Procedure for creating Knockout mice	
4.	IV	37. Preparation of Growth Media	03	Growth media and Types of Growth media Natural Media Synthetic media	
		38. Microbial Culture and management	06	Culture Initiation Preparation and Sterilization of Culture media Sterilization of substrates and glassware Isolation of explants Disaggregation of explants Culture and subculture Prevention of Mangement	

		39. Molecular diagnosis of genetic diseases	03	Genetic disease Methods of molecular diagnosis of genetic diseases	
		40. Recombinant DNA in medicine	02	Recombinant Insulin Human growth hormone	
		41. Gene Therapy	03	Concept of Gene therapy Types of gene therapy Somatic Gene Therapy Germline gene therapy	

Teaching Plan Year 2020

Name of the faculty member: Dr Pervaize Ahmad

Designation: Assistant Professor

Department: Zoology

Subject: Zoology

Semester: 6th

Subject /Title Code: Immunology

S. no.	Unit	Topics Covered	No. of Lectures	Subtopics/Lectures	Pedagogical aid
1	I	1. Introduction to basic concepts in immunology	03	Introduction A historical Perspective of Immunology Concept of Immunity	
		2. Components of Immune System	05		
		3. Principles of Innate and Adaptive immune system	10	Innate immunity First line of defence Physical barrier Chemical barriers Second line of defence Phagocytosis, Endocytosis Inflammation Acquired/ adaptive immunity Characteristics of Immune response Humoral immunity Cell mediated immunity	
		4. Cells and organs of immune system	05	Lymphatic Organs Primary Lymphoid Organs	

				THYMUS GLAND BURSA OF FABRICIUS AND BONE MARROW Secondary Lymphoid Organs THE SPLEEN LYMPH NODES	
		5. Haematopoiesis	03	Process of Haematopoiesis Formation of Myeloid lineage cells Formation of Lymphoid lineage cells	
2	II	6. Basic properties of antigen	03	Concept and Basic properties of antigen Classes of antigen	
		7. B and T cell epitopes, haptens and Adjuvants	06	Epitopes Characteristics of Epitopes recognised by B Cells Characteristics of Epitopes recognised by C cells Haptens Adjuvants	
		8. Structures, classes and Types of Antibodies	05	Structure of immunoglobulin (IgG) IgM and its functions IgD and its functions IgE and Its functions IgA and its functions	
		9. Monoclonal Antibodies	03	Concept of monoclonal antibodies Production of monoclonal antibodies Advantages and limitations	

		10. Antigen antibody interactions	03	Antigen antibody interaction Neutralization, Agglutination Precipitation, opsonisation Cross reactivity	
3.	III	11. MHC genes and their products	03	Concept of MHC genes Classes of MHC genes Pattern of expression of MHC genes	
		12. MHC antigens	04	MHC antigens Structure of MHC I antigen Structure of MHC II antigens Functions of MHC antigens	
		13. Antigen processing and presentation	04	Concept of antigen processing and presentation Exogenous processing and presentation of antigen Endogenous processing and presentation of antigen and	
		14. Cytokines	04	Basic concept of cytokines Classes and nomenclature Basic properties of cytokines Biological functions of cytokines	
		15. Complement system	05	Concept of complement system Complement pathways Classical pathways Alternative pathway Lectin pathway Functions of complement system	
4.	IV	16. Hypersensitivity	05	Concept of hypersensitivity	

				Classification of hypersensitivity Type I hypersensitivity Type II hypersensitivity Type III hypersensitivity Type IV hypersensitivity	
		17. Immunodeficiency	06	Immunodeficiency Causes of immunodeficiency Classes of immunodeficiency Combined immunodeficiency SCID Clinical presentation of SCID Diagnosis and treatment	
		18. Autoimmune diseases	06	Autoimmune diseases Categories of autoimmune disease Organ specific autoimmune diseases Systemic autoimmune diseases LEPUS Arthritis	
		19. Vaccines	04	Concept of vaccination Types of vaccines Working of vaccines National immunization and VPDS	

Teaching Plan Year 2020

Name of the faculty member: Dr Pervaize Ahmad

Designation: Assistant Professor

Department: Zoology

Subject: Zoology

Semester: 5th

Subject /Title Code: Animal Biotechnology

S. no.	Unit	Topics Covered	No. of Lectures	Subtopics/Lectures	Pedagogical aid
1	I	1. Concept and Scope of Biotechnology	03	Introduction Concept Scope and Importance	
		2. Cloning Vectors	05	Concept of Vectors Cloning vectors Plasmid Phagemid Cosmid Vectors Bacteriophage	
		3. Expression Vectors	02	Expression vectors Characteristics	
		4. Restriction Enzymes	04	Concept of Restriction enzymes Types of RE Nomenclature of RE Type II RE in Detail	
		5. Transformation Techniques	03	Concept of Transformation and Methods Calcium Chloride Method Electroporation	
2	II	6. DNA Libraries	05	Concept of DNA libraries Construction of Genomic Libraries Construction of cDNA libraries Screening of DNA libraries by Colony hybridization Screening by plaque hybridization	

		7. Blotting techniques	08	Concept and importance of Blotting Southern Blotting Concept and principle Procedure of SB Application of SB Northern Blotting Concept and principle Procedure of NB and Application of NB Western Blotting Concept and principle Procedure of WB and Application of WB	
		8. DNA Sequencing	02	Concept of Sequencing Sangers Method of Sequencing	
		9. Polymerase Chain Reaction	03	Concept and Mechanism Principle and Procedure Applications of PCR	
		10. DNA Finger Printing	02	Concept, Principle and Procedure Applications	
		11. DNA Micro array	02	Concept and procedure Applications	
3.	III	12. Production of Cloned and transgenic animals	05	Concept of cloning Concept of transgenic animals Formation of transgenic animals by nuclear transplantation Formation of transgenic animals by nuclear transplantation Retroviral method	

				DNA microinjection	
		13. Transgenic Animals	06	Mice Cattle Sheep Goat Birds fish	
		14. Applications of transgenic Animals	02	Common applications of transgenic animals	
		15. Production of pharmaceuticals	02	Targeted Production of Pharmaceutical Proteins Insulin and Growth hormone Drugs or Molecular Pharming	
		16. Production of Donar organs	02	Donar organs Production of Organs for Xenotransplantation	
		17. Knockout mice	02	Concept and uses of Knockout mice Procedure for creating Knockout mice	
4.	IV	18. Preparation of Growth Media	03	Growth media and Types of Growth media Natural Media Synthetic media	
		19. Microbial Culture and management	06	Culture Initiation Preparation and Sterilization of Culture media Sterilization of substrates and glassware Isolation of explants Disaggregation of explants Culture and subculture Prevention of Mangement	

		20. Molecular diagnosis of genetic diseases	03	Genetic disease Methods of molecular diagnosis of genetic diseases	
		21. Recombinant DNA in medicine	02	Recombinant Insulin Human growth hormone	
		22. Gene Therapy	03	Concept of Gene therapy Types of gene therapy Somatic Gene Therapy Germline gene therapy	

Teaching Plan Year 2019

Name of the faculty member: Dr Pervaize Ahmad

Designation: Assistant Professor

Department: Zoology

Subject: Zoology

Semester: 3rd

Subject /Title Code: Animal Physiology and biochemistry

Unit	Topics Covered	No. of Lectures	Subtopics/Lectures	Pedagogical aid
I	1. Digestion Physiology of digestion, absorption of carbohydrates, proteins and lipids	07	Organs/Enzymes of digestion, Absorption of Glucose, Amino acids, Emulsification and Absorption of fats - Chylomicrons	
	2. Respiration Pulmonary respiration, Respiratory volumes and capacities, Transport of oxygen and carbon dioxide in blood, types of respiratory pigments, Oxygen Dissociation curve	05	Introduction to respiratory system Partial Pressure, diffusion of O ₂ and CO ₂ Transport in blood – role of RBC/plasma Hemoglobin/Myoglobin/Chlorocruorin/Hemocyanin Oxygen dissociation Curve – effect of pH, CO ₂ (Bohr Effect), Temperature, Acidity	
	3. Excretion Types of nitrogenous wastes, Structure of nephron, Urine formation	05	Ammonotelic. Ureotelic and Uricotelic Renal Corpuscle/PCT/Henl's Loop/DCT Role of nephron in urine formation – counter current mechanism	
	4. Circulatory system	04	Structure of heart/blood vessels/blood SA Node/Av Node/Purkinje fibres	

	Conducting system of heart, Origin and conduction of cardiac impulse			
II	5. Structure of a typical motor neuron, Different types of potentials, Action Potential and its Propagation in different nerve fibres	05	Structure of neuron – Dendrites, axon, neurolemma Role of Sodium/potassium pump Resting/action potential, various ion channels Action potential propagation - saltatory	
	6. Molecular and chemical basis of muscle contraction	06	Structure of muscle fibre, role of calcium-actin-myosin-troponin-tropomyosin Sliding-filament theory	
	7. Physiology of vision	05	Structure of eye –brief idea Reception of light and production and propagation of action potential through optic nerve	
	8. Physiology of hearing	06	Structure of ear – brief idea Mechanism of hearing	
III	9. Hormonal control of gametogenesis	07	Basic concept of signaling through hormones Spermatogenesis/oogenesis –basic description Role of LH/FSH/Estrogen/progesterone/testosterone in gametogenesis	
	10. Hormonal control of menstrual cycle	03	Menstrual cycle – role of hormones/different stages of menstrual cycle	
	11. Hormones of pituitary, thyroid and parathyroid	04	Structure/location –brief idea	

			Various hormones secreted by pituitary/thyroid/parathyroid glands, their importance in regulation, various disorders	
	12. Hormones of pancreas, adrenal	05	Structure/location Hormones – their role in metabolism and associated disorders	
IV	13. Carbohydrate metabolism Glycolysis, Krebs cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogen metabolism	04	Location, enzymes, substrates and Complete sequence of reactions, regulation	
	14. Lipid Metabolism Biosynthesis and Beta oxidation of palmitic acid	04	Lipid synthesis, beta oxidation of saturated and unsaturated lipids	
	15. Protein Metabolism Transamination, Deamination and urea cycle	05	Location, enzymes, substrates and regulation	
	16. Enzymes Introduction and classification of enzymes, Mechanism of action, enzyme Inhibition and regulation	04	Enzymes – characteristics Role of co-enzymes/cofactors Holoenzymes/apoenzymes Michaelis Menton equation Allosteric inhibition	

Teaching Plan Year 2019

Name of the faculty member: Dr Pervaize Ahmad

Designation: Assistant Professor

Department: Zoology

Subject: Zoology

Semester: 1st

Subject /Title Code: Animal Diversity

S. no.	Unit	Topics Covered	No. of Lectures	Subtopics/Lectures	Pedagogical aid
1	I	1. Protista	05	General characters. Classification up to classes. Locomotion in Protozoa	
		2. Phylum Porifera	03	General characters. Classification up to classes. Canal system in sponges	
		3. Phylum Cnidaria	03	General characters. Classification up to classes. Polymorphism in Hydrozoa	
		4. Phylum Helminthes	07	General characters. Classification up to classes. Life history of Taenia solium. General characters and classification of Nematelminths up to classes. Life history of Ascaris lumbricoides. Parasitic adaptations	
2	II	5. Phylum Annelida	04	General characters classification up to classes Metamerism in Annelida	

		6. Phylum Arthropoda	07	General characters Classification up to classes Vision in Insects. Metamorphosis in Insects.	
		7. Phylum Mollusca:	03	General characters. classification up to classes. Torsion in Gastropods.	
		8. Phylum Echinodermata:	04	General characters classification up to classes; Water-vascular system in Asteroidea	
3.	III	9. Protochordates	04	General features Phylogeny of Protochordates.	
		10. Urochordates and Cephalochordates.	06	General characters classification	
		11. Phylum Agnatha	02	General features. Classification	
		12. Phylum Pisces	06	General characters of Pisces Classification of Chondrichthyes and Osteichthyes up to orders. Economic importance of Fishes.	
4.	IV	13. Phylum Amphibia:	04	General characters Classification up to orders; Parental care in Amphibians.	
		14. Phylum Reptiles:	06	General characters Classification up to orders; Poisonous and Non-poisonous snakes, Biting mechanism in snakes	
		15. Phylum Aves	04	General characters	

				Classification up to orders; Flight adaptations in birds	
		16. Phylum: Mammals	02	General characters Classification up to orders; Origin and Adaptive Radiation in Mammals.	

Teaching Plan Year 2018

Name of the faculty member: Dr Pervaize Ahmad

Designation: Assistant Professor

Department: Zoology

Subject: Zoology

Semester: 1st

Subject /Title Code: Animal Diversity

S. no.	Unit	Topics Covered	No. of Lectures	Subtopics/Lectures	Pedagogical aid
1	I	1. Protista	05	General characters. Classification up to classes. Locomotion in Protozoa	
		2. Phylum Porifera	03	General characters. Classification up to classes. Canal system in sponges	
		3. Phylum Cnidaria	03	General characters. Classification up to classes. Polymorphism in Hydrozoa	
		4. Phylum Helminthes	07	General characters. Classification up to classes. Life history of Taenia solium. General characters and classification of Nematelminths up to classes. Life history of Ascaris lumbricoides. Parasitic adaptations	
2	II	5. Phylum Annelida	04	General characters classification up to classes Metamerism in Annelida	

		6. Phylum Arthropoda	07	General characters Classification up to classes Vision in Insects. Metamorphosis in Insects.	
		7. Phylum Mollusca:	03	General characters. classification up to classes. Torsion in Gastropods.	
		8. Phylum Echinodermata:	04	General characters classification up to classes; Water-vascular system in Asteroidea	
3.	III	9. Protochordates	04	General features Phylogeny of Protochordates.	
		10. Urochordates and Cephalochordates	06	General characters classification	
		11. Phylum Agnatha	02	General features. Classification	
		12. Phylum Pisces	06	General characters of Pisces Classification of Chondrichthyes and Osteichthyes up to orders. Economic importance of Fishes.	
4.	IV	13. Phylum Amphibia:	04	General characters Classification up to orders; Parental care in Amphibians.	
		14. Phylum Reptiles:	06	General characters Classification up to orders; Poisonous and Non-poisonous snakes, Biting mechanism in snakes	

		15. Phylum Aves	04	General characters Classification up to orders; Flight adaptations in birds	
		16. Phylum: Mammals	02	General characters Classification up to orders; Origin and Adaptive Radiation in Mammals.	

Teaching Plan Year 2018

Name of the faculty member: Dr Pervaize Ahmad

Designation: Assistant Professor

Department: Zoology

Subject: Zoology

Semester: 2nd

Subject /Title Code: Comparative Vertebrate anatomy and embryology

S. no.	Unit	Topics Covered	No. of Lectures	Subtopics/Lectures	Pedagogical aid
1	I	1. Integumentary System	06	Integument Components of integument Functions of integument. Soft derivatives of integument. Hard derivatives of integument.	
		2. Skeletal System	03	Skeleton & types of skeleton. Modification and evolution of visceral arches	
		3. Digestive System	03	Digestion and comparative account of alimentary canal in vertebrates Comparative account of digestiveglands.	
		4. Respiratory System	07	Respiration and types of respiration. Respiratory system in vertebrates Brief account of Gills, Brief account of lungs, Brief account of Air-sacs Brief account of Swim bladder	
2	II	5. Circulatory System	05	Circulatory System, types & functions Evolution of heart Evolution of aortic arches	

		6. Urinogenital System	07	Urinogenital system brief account Evolution of kidney Evolution of urinogenital ducts	
		7. Nervous System	03	Nervous system brief account. Functions of nervous system Comparative account of brain	
		8. Sense Organs	05	Sense organs brief account Different types of receptors, based on different parameters. Comparative account of different special sensory receptors	
3.	III	9. Gametogenesis	04	Spermatogenesis oogenesis	
		10. Fertilization in mammals	06	Fertilization & its types	
		11. Types and patterns of cleavage	03	Cleavage, planes and patterns Types of cleavage	
		12. Blastulation and Gastrulation in frog	04	Blastulation & its types Gastrulation in frog	
4.	IV	13. Extra embryonic membranes	01	Four standard extra-embryonic membranes.	
		14. Types of placenta	03	Types of placenta based on different parameters	
		15. Basic processes in development	04	Basic processes in development General account of gene activation, determination induction	

		16. Basic processes in embryonic development	03	Basic processes in embryonic development differentiation, intra cellular communications, cell movement cell death	

Teaching Plan Year 2017

Name of the faculty member: Dr Pervaize Ahmad

Designation: Assistant Professor

Department: Zoology

Subject: Zoology

Semester: 1st

Subject /Title Code: Animal Diversity

S. no.	Unit	Topics Covered	No. of Lectures	Subtopics/Lectures	Pedagogical aid
1	I	1. Protista	05	General characters. Classification up to classes. Locomotion in Protozoa	
		2. Phylum Porifera	03	General characters. Classification up to classes. Canal system in sponges	
		3. Phylum Cnidaria	03	General characters. Classification up to classes. Polymorphism in Hydrozoa	
		4. Phylum Helminthes	07	General characters. Classification up to classes. Life history of Taenia solium. General characters and classification of Nematelminths up to classes. Life history of Ascaris lumbricoides. Parasitic adaptations	
2	II	5. Phylum Annelida	04	General characters classification up to classes Metamerism in Annelida	

		6. Phylum Arthropoda	07	General characters Classification up to classes Vision in Insects. Metamorphosis in Insects.	
		7. Phylum Mollusca:	03	General characters. classification up to classes. Torsion in Gastropods.	
		8. Phylum Echinodermata:	04	General characters classification up to classes; Water-vascular system in Asteroidea	
3.	III	9. Protochordates	04	General features Phylogeny of Protochordates.	
		10. Urochordates and Cephalochordates.	06	General characters classification	
		11. Phylum Agnatha	02	General features. Classification	
		12. Phylum Pisces	06	General characters of Pisces Classification of Chondrichthyes and Osteichthyes up to orders. Economic importance of Fishes.	
4.	IV	13. Phylum Amphibia:	04	General characters Classification up to orders; Parental care in Amphibians.	
		14. Phylum Reptiles:	06	General characters Classification up to orders; Poisonous and Non-poisonous snakes, Biting mechanism in snakes	
		15. Phylum Aves	04	General characters	

				Classification up to orders; Flight adaptations in birds	
		16. Phylum: Mammals	02	General characters Classification up to orders; Origin and Adaptive Radiation in Mammals.	

Teaching Plan Year 2017

Name of the faculty member: Dr Pervaize Ahmad

Designation: Assistant Professor

Department: Zoology

Subject: Zoology

Semester: 2nd

Subject /Title Code: Comparative Vertebrate anatomy and embryology

S. no.	Unit	Topics Covered	No. of Lectures	Subtopics/Lectures	Pedagogical aid
1	I	1. Integumentary System	06	Integument Components of integument Functions of integument. Soft derivatives of integument. Hard derivatives of integument.	
		2. Skeletal System	03	Skeleton & types of skeleton. Modification and evolution of visceral arches	
		3. Digestive System	03	Digestion and comparative account of alimentary canal in vertebrates Comparative account of digestive glands.	
		4. Respiratory System	07	Respiration and types of respiration. Respiratory system in vertebrates Brief account of Gills, Brief account of lungs, Brief account of Air-sacs Brief account of Swim bladder	

2	II	5. Circulatory System	05	Circulatory System, types & functions Evolution of heart Evolution of aortic arches	
		6. Urinogenital System	07	Urinogenital system brief account Evolution of kidney Evolution of urinogenital ducts	
		7. Nervous System	03	Nervous system brief account. Functions of nervous system Comparative account of brain	
		8. Sense Organs	05	Sense organs brief account Different types of receptors, based on different parameters. Comparative account of different special sensory receptors	
3.	III	9. Gametogenesis	04	Spermatogenesis oogenesis	
		10. Fertilization in mammals	06	Fertilization & its types	
		11. Types and patterns of cleavage	03	Cleavage, planes and patterns Types of cleavage	
		12. Blastulation and Gastrulation in frog	04	Blastulation & its types Gastrulation in frog	
4.	IV	13. Extra embryonic membranes	01	Four standard extra-embryonic membranes.	
		14. Types of placenta	03	Types of placenta based on different parameters	

		15. Basic processes in development	04	Basic processes in development General account of gene activation, determination induction	
		16. Basic processes in embryonic development	03	Basic processes in embryonic development differentiation, intra cellular communications, cell movement cell death	