


DEPARTMENT OF ZOOLOGY, TURA GOVERNMENT COLLEGE
DISTRIBUTION OF SYLLABUS FOR EVEN SEMESTERS, 2017

II SEMESTER (Paper 2A)

SL No.	NAME	UNIT	TOPIC
1.	Dr. Meena A. Sangma	IV	Mendel's experiments and principles of inheritance; Concept of genotype, phenotype, dominance, recessiveness, co-dominance and incomplete dominance; Back cross and Test cross. Chromosomal theory of inheritance.
2.	Verlia Semchi G. Momin	II	Nuclear envelope and nucleolus. Chromatin: Chemical composition and organisation of Euchromatin and heterochromatin; Chromosome: Morphology, primary constriction, secondary constriction, and satellite bodies. Classification on the basis of position of centromere; Polytene and lampbrush chromosomes.
3.	Taseng K. Marak	I	Prokaryotic and eukaryotic cells. Ultrastructure and functions of plasma membrane, mitochondria, endoplasmic reticulum, golgi complex, ribosomes, centrioles and lysosomes. Cytoskeleton: Introduction to microtubules and microfilaments.
4.	Silme D. Shira	IV	Multiple alleles (ABO blood groups in man); Gene interactions: Complementary, supplementary, inhibitory and duplicate types; Pleiotropic genes and lethal genes (Tay Sachs disease and sickle cell anemia)
5.	Grimchi T. Sangma	III	Cell cycle: Phases and regulation; Mitosis, meiosis, synaptonemal complex. Cancer:

			Characteristics of cancer cells, classification according to tissue types; Common carcinogens. Immunity: innate and acquired; Active and passive immunity; Cells and organs of the immune system.
6.	Cordelia P. Warbah	V	Linkage and crossing over. Sex determination: Chromosomal and genic balance theories, environmental factors. Chromosomal aberrations: Structural (deletion, duplication, inversion and translocation) and numerical (euploidy and aneuploidy).



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IV SEMESTER (Paper 4 A)

SL No.	NAME	UNIT	TOPIC
1.	Dr. Meena A. Sangma	I	Gametogenesis: Spermatogenesis and oogenesis; Fertilisation; Parthenogenesis. Types of eggs; Cleavage and Types of cleavage
2.	Verlia Semchi G. Momin	IV	Pisciculture: Culturable fish species of India; Culture and management of fish with reference to composite fish culture; Induced breeding. Sericulture: Different species of silk moth; Life history of Bombyx mori and methods of culture; Products of sericulture and its economic importance.
3.	Taseng K. Marak	III	Ecological niche. Population: Growth and regulation. Concepts of biotic community. Inter and intraspecific interactions. Resources (renewable and non renewable) and their management. Environmental pollution (air, water and soil)
4.	Silme D. Shira	V	Apiculture: Species of honey bees; Life history and social organisation; Methods of bee keeping, economic importance. Integrated pest management (Physical, chemical, hormonal and biological)
5.	Grimchi T. Sangma	I	Process of blastulation, fate map and Gastrulation in frog upto the formation of three germ layers; Metamorphosis in insects and frog.
6.	Cordelia P. Warbah	II	Ecology: Concepts, subdivisions, scope and importance; Levels of organisation in the biosphere. Structure of ecosystem- Ecological factors (biotic and abiotic); Trophic structure: Food chains, food webs and energy flow; Trophic relationships- ecological pyramids. Productivity.

VI SEMESTER (Paper 7A)

SL No.	NAME	UNIT	TOPIC
2.	Verlia Semchi G. Momin	V	Reproductive cycles (estrous and menstrual) in mammals; Hormonal regulation of spermatogenesis and oogenesis in humans; In vitro fertilisation and embryo transfer technology; Pregnancy hormones; Lactation; Contraceptive methods for males and females.
3.	Taseng K. Marak	I	Chemical foundations of physiology: Concept of normal, molar and molal solutions; Acids, bases, pH and buffers; Diffusion and osmotic pressure. Enzyme kinetics: Michaelis-Menten equation and its relation to enzyme activity; Significance of K_m and V_{max} ; Enzyme inhibition (reversible and irreversible).
4.	Silme D. Shira	II	Carbohydrates: Linear and ring forms of monosaccharides (Pentose and Hexose); Polysaccharides (starch, glycogen and hyaluronic acid); Glycogenesis and glycogenolysis. Electron transport system and oxidative phosphorylation. Amino acids, peptides and proteins: levels of organisation, transamination; deamination and urea cycle.
5.	Grimchi T. Sangma	III	Structure and functions of haemoglobin; Blood coagulation: Coagulation factors and mechanism. Cardiac cycle. Blood pressure and its regulation. Mechanism of gaseous exchange through gills and lungs. Osmoregulation in fish.
6.	Cordelia P. Warbah	IV	Neurosecretory cells; Types of neurohormones; Endocrine and paracrine hormones; Placental hormones; Hormones of gastrointestinal tract; Pheromones. Biosynthesis of thyroid hormones. Mechanism of hormone action: Peptide/protein and steroid hormones.


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VI SEMESTER (Paper 8A)

SL No.	NAME	UNIT	TOPIC
1.	Dr. Meena A. Sangma	I II	Patterns of cleavage; Morphogenetic movements (epiboly, invagination, ingression, involution and delamination); Embryonic induction and concept of Organiser; Gastrulation in chick up to the formation of three germinal layers. Foetal membranes and types of placenta in mammals; Organogenesis of the vertebrate eye; Regeneration in invertebrates and vertebrates; Teratogenesis and developmental birth defects. Concepts of Ageing.
2.	Verlia Semchi G. Momin	V	Introduction to genetic engineering; Restriction enzymes. Cloning vectors: Plasmid, cosmid, λ phage, shuttle vectors; Expression vectors. Introduction to host cells: Transformation, transduction; Particle gun.
	Taseng K. Marak	V	Southern blotting; PCR; DNA Fingerprinting; Genomic library and cDNA library; Application of recombinant DNA technology. Ethical issues and Biosafety regulations.
	Silme D. Shira	III	Salient features of aquatic and terrestrial ecosystems. Liebig's law of limiting factors and Shelford's law of tolerance. Biogeochemical cycles: carbon, phosphorous and nitrogen cycles. Ecological succession. Major Biomes.
	Grimchi T. Sangma	IV	Environmental concerns: Radioactive pollution; Biological indicators; Biomagnification; Anthropogenic activity and environment: Ozone depletion; Green house effect and global warming; Acid rains.
	Cordelia P. Warbah	IV	Wildlife conservation: In situ (sanctuaries, national parks and biosphere reserves) and ex situ (botanical and zoological gardens, Germplasm Bank).

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PAPER 2B

Concerned teachers: Verlia Semchi G. Momin & Silme D. Shira

1. Study of cell organelles from slides/models/charts
2. Preparation and study of different stages of mitosis in onion root tip.
3. Preparation (demonstration only) and study of different stages of meiosis from grasshopper testis using permanent slides.
4. Study of chromosome types from slides/photographs.
5. Preparation and study of polytene chromosomes from *Chironomous* larva.
6. Study of phenotypic variations in a natural population (at least 3 characters).
7. Determination and study of multiple alleles (ABO blood groups) and Rh factor.

PAPER 4B

Concerned teachers: Dr. Meena A. Sangma, Verlia Semchi G. Momin & Silme D. Shira

1. Study of types of eggs in vertebrates
2. Study of larval forms (crustacean, molluscan and echinoderm) from permanent slides.
3. Study of the stages of development of frog from permanent slides in whole mount/sections (cleavage, blastula and gastrula).
4. Preparation of permanent slides of non chordate larval forms (Mysis, Nauplius, mosquito larva).
5. Study of metamorphosis in Amphibia (using Charts/Models)
6. Estimation of dissolved oxygen in water samples.
7. Estimation of carbon dioxide in water samples.
8. Estimation of total alkalinity in water samples.
9. Qualitative study of plankton from fresh water samples.
10. Study of the life cycle of silk moth.
11. Study of different castes of honey bee.
12. Identification of Indian major carps and common exotic carps.

PAPER 7B

Concerned teachers: Taseng K. Marak & Grimchi T. Sangma

1. WBC count in human blood.
2. RBC count in human blood.
3. Estimation of glucose by colorimetric method.
4. Estimation of protein by colorimetric method (Lowry's/Biuret) method
5. Study of human salivary amylase activity in relation to temperature.
6. Estimation of haemoglobin in human blood.
7. Dissection and display of pituitary and gonads in a teleost.
8. Dissection and display of endocrine glands in albino mouse/rat.
9. Microtomy: Preparation of histological slides of vertebrate tissues- liver, kidney, gonads, intestine and adrenal (minimum four slides of different tissues).

PAPER 8B

Concerned teachers: Dr. Meena A. Sangma & Cordelia P. Warbah

1. Preparation of whole mount of chick embryo.
2. Study of regeneration in Hydra/Planaria.
3. Study of whole mount/sections of different developmental stages of chick embryo from permanent slides.
4. Community analysis
5. Qualitative analysis of aquatic communities from different water bodies.
6. Estimation of total hardness of water samples.
7. Quantitative estimation of plankton.
8. Analysis of community similarities and species diversity indices.
9. Field trip and submission of Field Report.

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