



ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Course Structure and Syllabus

M.Sc. Zoology

(For Admission Batch 2018-19)

FIRST SEMESTER



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Course Structure and Syllabus

M.Sc. Zoology

FIRST SEMESTER

1st semester: Course Structure

Sl. No.	Sub Code	Subject	Hrs / Week			Credit
			L	T	P	C
Theory						
1	MZY182101	Cell Biology	4	0	0	4
2	MZY182102	Developmental Biology	4	0	0	4
3	MZY182103	Animal Physiology and Endocrinology	4	0	0	4
4	MZY182104	Ecology and Wildlife	3	0	0	3
Practical						
1	MZY182111	Lab – I Cell Biology	0	0	4	2
2	MZY182113	Lab – II Physiology and Endocrinology	0	0	4	2
3	MZY182114	Lab – III Ecology & Wildlife	0	0	4	2
Total			15	0	12	21
Total Contact Hours per Week = 27						
Total Credit = 21						

Subject Code: MZY182101**Subject : CELL BIOLOGY**

L-T-P : 4-0-0

Credit – 4

Module	Topic	Course Content	Hours
1.	Chemical complexity and organization	Distinctive structural and Molecular features of prokaryotic and eukaryotic cells.	6
2.	Plasma membrane	Models of plasma membrane structures, membrane lipids, proteins and carbohydrates. Organizational and functional features of the plasma membranes. Transport of molecules across the plasma membrane.	10
3.	Mitochondria	Structure, assemblies of respiratory chain and F_0-F_1 , ATPase, oxidative and other high energy compounds.	8
4.	Cell-cell adhesion	Ca^{2+} dependent and Ca^{2+} independent hemophilic cell-cell adhesion. Gap junction and connexins, Cell-matrix adhesion, Integrin's, collagen.	6
5.	Cell division and cell cycle	Mitosis and meiosis, Steps in cell cycle, cell cycle control mechanism.	4
6.	Cell-cell signaling	Basic mechanism of cell signaling pathways, role of cell surface receptors in cell signaling, second messenger system. Mechanism and regulation of signal translation.	6
7.	Targeting and sorting of proteins	Processing through endomembrane system, targeting of cytosolic proteins.	4
8.	Apoptosis	Definition, Extrinsic and Intrinsic pathways of apoptosis. Significance of apoptosis.	4
		Total	48

Text Books/ Reference Books:

1. LODISH, H. F., BERK, A., KAISER, C., KRIEGER, M., SCOTT, M. P., BRETSCHER, A., PLOEGH, H. L., & MATSUDAIRA, P. T. (2008). Molecular cell biology. New York, W.H. Freeman.
2. ALBERTS, B., JOHNSON, A., LEWIS, J., RAFF, M., ROBERTS, K., & WALTER, P. (2002). Molecular biology of the cell. New York, Garland Science.

Subject Code: MZY182102
Subject: Developmental Biology

L-T-P : 4-0-0

Credit - 4

Module	Topic	Course Content	Hours
1.	Fertilization	Pre and post fertilization events. Recognition of gametes and acrosomal reaction. Prevention of polyspermy and gamete fusion. Activation of egg metabolism.	6
2.	General concept	Induction: Development of eye in vertebrates. Determination: Imaginal disc of insects. Differentiation: Formation of fruiting body of dictyostelium.	6
3.	Morphogenesis and cell adhesion	Thermodynamic model of cell interaction; Concept of morphogen gradient and morphogenetic fields.	6
4.	Principles of experimental embryology	The developmental dynamics of cell specification. Stem cells and developmental commitment.	6
5.	Nucleocytoplasmic interaction	Nucleocytoplasmic interaction in development and differentiation of unicellular organisms and in early development and differentiation of multicellular organisms. Importance and role of cytoplasm hybridization experiment.	10
6.	Hormonal regulation in development	Development of mammary gland in mammals; Hormonal control of metamorphosis in Amphibians and insects.	8
7.	Organogenesis	Valve formation in <i>Caenorhabditis elegans</i>	2
8.	Embryonic stem cells and their applications	Regeneration therapy	4
		Total	48

Text Books/ Reference Books

1. S.F. Gilbert. Developmental Biology, 8th edition (2006), Publisher - Sinauer Associates Inc
2. Kalthoff: (1996) Analysis of biological development. McGraw-Hill.
3. Wolpert: Principles of development. Oxford, 2002.

Subject code: MZY182103

Subject: Animal Physiology and Endocrinology

L-T-P: 4-0-0

Credit – 4

Module	Topics	Course Content	Hours
1.	Physiology of Respiration	Respiratory pigments, Oxygen transport, Oxygen dissociation curves and their physiological significances, Transport of CO ₂ , Gaseous exchange through respiratory membrane and Tissues.	8
2.	Blood	Composition of blood, circulation and Blood coagulation, Haemopoiesis. Haemoglobin- Structure and Function,	4
3.	Heart	Structure of heart, Origin and Conduction of cardiac impulse, Cardiac cycle.	4
4.	Excretion	Structure of kidney and nephron, Urine formation and Regulation of urine formation.	3
5.	Thermoregulation	Heat balance in animals, Adaptations to temperature extremes, Aestivation and hibernation, acclimatization, avoidance and tolerance, stress and hormones. -Bioluminescence - Photoreception and chemoreception. - Pheromones	8
6.	Neuroscience	-Structure, function and types of neuron - Nerve impulse-origin and propagation - Action potential, Electrical properties of nerve cells. - Neurotransmitters (acetyl choline, serotonin and GABA) and their function - Synapse: Synaptic transmission and Neuromodulation	8
7.	Endocrinology	Introduction to endocrine system, classification of hormones, (protein/peptide hormone, steroid hormone, amino-acid derivatives, fatty acid derivatives) -Physiological actions of pituitary hormones, structure and function of adrenal gland, pancreas. Physiological actions of adrenal hormone.	8

		-Thyroid hormone action in poikilotherms and homeotherms.	
8.	Hormonal regulation	Hormone regulation of calcium and phosphate homeostasis -Hormonal control of feeding behaviour and gastrointestinal track functioning acid release.	5
		Total	48

Text Books/Reference Books:

1. W. Ganong- Review of medical physiology, 21st edition, International edition 2003, TATA Magro Hill
2. Freeman and Co. Hoar, W.S. General and Comparative Animal Physiology.
3. Guyton and Hall, Textbook of Medical Physiology- 13th Edition.

Subject code: MZY182104

Subject : Ecology and Wildlife

L-T-P : 3-0-0

Credit – 3

Module	Topics	Course Content	Hours
1.	Ecosystem	Principles pertaining to limiting factors -Ecosystem - Wetland and ecosystem - Concepts of habitats and niche -Trophic levels and its organization with reference to energy transfer -Nutrient cycling and pollution	8
2.	Habitat and niche	Concept of habitat and niche; niche width and overlap; fundamental and realized niche; resource partitioning; character displacement.	4
3.	Species interactions	Types of interactions, interspecific competition, herbivory, carnivore, pollination, symbiosis.	3
4.	Ecological Succession	Types; mechanisms; changes involved in succession; concept of climax.	3
5.	Population dynamics	-Population dynamics - Characteristics of a population ; population growth curves; population regulation; life history strategies (r and K selection) -Ecological genetics- importance of genetics to ecological,	5
6.	Wildlife	- Introduction to wildlife -Importance of Wildlife -Important Wildlife of Northeast India -Wildlife in Assam with references to Reptiles, Birds and mammals	5
7.	Wildlife Conservation	Wildlife conservation and management,. National Parks and Sanctuaries of Assam - Project Tiger - Project Gir Lion and Crocodile breeding project - Biospheres reserves	6
8.	Pollution	Greenhouse effect, Causes and control of pollution, Adverse effects of pollution.	2
		Total	36

Text Books/Reference Books:

1. Odum : Fundamentals of Ecology (Saunders, 1971)
2. Odum : Basic Ecology (Saunders, 1985)
3. Primark : A Primer of Conservation Biology (2nd ed. Sinauer Associates)

Subject Code : MZY182111

Subject : Lab - I Cell Biology

L-T-P : 0-0-4

Credit - 2

Unit	Experiments	Hours
1	Study of different types of cell from culture (Euglena, paramecium etc.); representative of both prokaryotic and eukaryotic cells from permanent slide.	4
2	Staining of nucleus and nucleolus.	4
3	Preparation and study of different types of epithelial cells: (squamous epithelial cells from buccal smear, ciliated epithelial cells from frog or toad by noninvasive method). From permanent slides: transitional epithelial cells from urinary bladder of frog, columnar epithelial cells from intestine and cuboidal epithelial cells from thyroid.	6
4	Study of different types of blood cells from preparation of blood smear from mammals.	4
5	Preparation and study of histological slides from tissues (liver, lungs, stomach, intestine, kidney, pancreas, spleen etc).	6
	Laboratory Note Book	
	Viva Voce	
	Total	24

Text books/Reference Books

1. Advanced Practical Zoology by Verma P.S. and Srivastava P.C.

Subject Code : MZY182113

Subject : Lab – II Physiology and Endocrinology

L-T-P : 0-0-4

Credit – 2

Unit	Experiments	Hours
1	Dissection of endocrine glands in vertebrates.	4
2	Total count of RBC and WBC	6
3	Differential count of W.B.C. from blood smear preparation.	6
4	Estimation of hemoglobin	4
5	Studies of histological structure of endocrine glands of vertebrates Histology of pituitary, thyroid, testes, ovary.	4
	Laboratory Note Book	
	Viva Voce	
	Total	24

Text books/Reference Books

1. Wilson, A. 1979. Principles of Animal Physiology, MacMillan Publishing co. Inc, New York.
2. Rastogi, S.T., 1988. Essentials of Animal Physiology, Wiley Eastern Limited, Madras

Subject Code : MZY182114

Subject: Lab – III Ecology and Wildlife

L-T-P: 0-0-4

Credit – 2

Unit	Experiments	Hours
1	Estimation of Dissolved oxygen and free carbon dioxide.	6
2.	Estimation of total alkalinity of water.	4
3	Estimation of total hardness of water.	4
4	Measurement of temperature and P ^H of water.	4
5	Qualitative estimation of Plankton samples collected from lentic and lotic water bodies.	6
	Laboratory Note Book	
	Viva Voce	
	Total	24

Text books/Reference Books

1. Gupta P.K. and V. Raviprakash, 1988. Advances in Toxicology and Environmental Health. Jagmandar Book Agency, New Delhi.
2. Sharma P.D., 1995. Environmental biology and toxicology-Rostogi and Company, Meerut, India.
3. Pandey, G.N. & G.C. Carney 1989. Environmental Engineering. Tata McGraw-Hill Publishing Co., Ltd.
