

TEACHING PLAN

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Teaching Plan of B.Sc. (Hons.) Zoology (Hons.+Gen.)
Microbiology (Hons.+Gen.), Food & Nutrition (Hons.)
Chemistry (Gen.) & Botany (Gen.)



BARRACKPORE RASTRAGURU SURENDRANATH COLLEGE

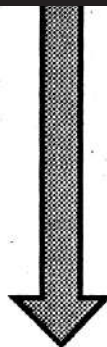
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Teaching Plan



B.Sc. (Hons.)
Zoology (Hons.+Gen.)
Microbiology (Hons.+Gen.)
Food & Nutrition (Hons.)
Chemistry (Gen.) & Botany (Gen.)

Department of Zoology (Honours)
TEACHING PLAN

PART I
SESSION 2016-2017

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures	MAY-JUNE
I	Diversity of Animals and Animal Behaviours (Full Marks 100)	10	0				
ZH101	Living kingdoms and protozoans 1. Introduction to the modern classification of living organisms into Kingdoms, magnitude of diversity of living organisms: estimated species richness 2. Introduction to the Kingdom Protozoa : Classifications (up to Phylum only) and examples; Special topics (brief outlines only) : contractile vacuoles, structures of cilia, reproduction in Paramecium.	Full Marks	3 6	3 6	Class Test	Periodical Examination Periodical Examination	Study leave and Counselling Periodical Examination Part I Examination
ZH102	Non-Chordates 1. <u>pecies diversity and classifications of non-chordate phyla</u> Poriferans, Cnidarians, Ctenophorans, Platyhelminths, Aschelminthes, Annelids, Molluscs, Echinoderms, Arthropods (upto subclass), Rotifera, Bryozoa, Hemichordata (only salient features of the Phyla)	35	56	2 2 2 2 2 4 4 4 1 1 1	2 2 2 2 2 4 4 4	4 4 1 1 1	

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR	MAY-JUNE				
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures					
	<p><u>2. Special topics to understand the diversity of non-chordate structures and functions :</u></p> <p>2.1 Body planes and symmetries, coelom, deuterostome vs protostome (only preliminary conceptual outlines)</p> <p>2.2 Polymorphisms in Cnidaria</p> <p>2.3 Coral reef : types, formation, distribution, conservation significance</p> <p>2.4 Torsions in Gastropods</p> <p>2.5 Cyclomorphosis in Rotifers</p> <p>2.6 Excretion in invertebrates with special reference to flame cells, nephridia, coelomoducts and malpighian tubules</p> <p>2.7 Gas exchange by gills and trachea in Arthropods</p> <p>2.8 Water vascular system and haemal system in Echinoderms</p> <p>2.9 Brief overview of in vertebrate larval forms</p>	Full Marks	2		2						
			3	Class Test	3			Periodical Examination	Periodical Examination	Study leave and Counselling	
			3		3						
			2				2				
			1				1				
			5				5				
			3								3
			5								5
			3								3
		3					5				
	Total		65	27		19					
ZH103	<p>Chordates</p> <p><u>1. Chordate Classifications :</u> (up to orders with salient features and examples, except for birds and mammals only names and examples of the orders)</p> <p><u>2. Chordates : special topics reflecting diversity of adaptations</u></p> <p>2.1 Feeding in Cephalochordates and Urochordates</p>	34	45								
			18	18							
			3	3							

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Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR	MAY-JUNE		
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures	Periodical Examination	Periodical Examination	Study leave and Counselling
	2.2 Larval form and metamorphosis in Ascidians	Full Marks	2	2					
	2.3 Experimental analysis of function of a vertebrate structure: study of feeding strike of a venomous snake		1	1					
	2.4 Biting, venom delivery and feeding in snakes		2	2					
	2.5 General features of vertebrate integument and its specialization with reference to exoskeletons		3	3					
	2.6 Evolution of aortic arches in vertebrates		3		Class Test	3			
	2.7 Evolutionary trend in vertebrate brains		3			3			
	2.8 Tripartite concept of kidney organization		3			3			
	2.9 Ruminant stomachs- Digestive tract specializations as fermentation chambers in herbivore mammals		3			3			
	2.10 Dentitions in vertebrates		2			2			
	2.11 Vertebrae : different type		2			2			
	Total			45	29	16			
ZH104	Animal Behaviour 1. Tinbergen's four questions on studying animal behaviour ; 2. Definitions and examples of- habituation, instinctive behaviour, FAP, imprinting and other programmed learning, cultural transmission 3. Social animals- advantages and disadvantages of living in a group, examples of social animals and outline of their social structures	20	26						
			2	2					
			12	8	4				
			6		4	2			

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures	MAY-JUNE
	4. Definition and examples of altruism, eusociality, units of selection (just preliminary ideas)		6			6	
	Total		100	136	63	46	27
II ZH 201	Evolution and Preliminary knowledge for quantification in biology	50					
	Evolution-	35	45				
	i) Rise of evolutionary theories		5		5		
	ii) H-W theorem and its significance in evolutionary biology		4		4		
	iii) Variations in natural populations	Full Marks	3			3	
	iv) Nature and actions of Natural selection – evolution of industrial melanism in <i>Biston betularia</i> as example		4	Class Test		4	
	v) Genetic Drift, Gene flow and Mutation rate		6			6	
	vi) Application of the concept of adaptation		2			2	
	vii) Trends in the evolution of modern horses		3			3	
	viii) Measurement of rates of evolution including allometry		2			2	
	ix) Punctuationalist vs. gradualist mode of evolutionary changes		2			2	
	x) Heterochrony		3			3	
	xi) Process of speciation : concept of reproductively isolated species and models of speciation- Allopatric, Sympatric and Parapatric models		5			5	
	xii) Recent knowledge about hominid evolution -a brief outline		4			4	
	Total		43		9	34	

Part I Examination
Study leave and Counselling

Periodical Examination
Periodical Examination

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT		OCT-DEC		JAN-APR		MAY-JUNE	
				Weeks (9-10)	No. of Lectures	Weeks (6-8)	No. of Lectures	Weeks (10-12)	No. of Lectures		
ZH202	Preliminary knowledge for quantification in biology i) Logarithm ii) Matrices iii) Permutation and Combination iv) Probabilities v) Graphical representation of data vi) Discrete and continuous variables vii) Mean, Mode and Median viii) Standard deviation, Variance and Standard error ix) Simple Correlations, x) Concept of hypothesis testing, Tests for goodness of fit- Chi-square, Student t-test	15	26								
		Full Marks		Class Test		Periodical Examination	Periodical Examination	Periodical Examination	Study leave and Counselling	Part I Examination	
			2	2							
			2	2							
			3	3							
			3	3							
			2	2							
			1			1					
			2			2					
			3			3					
			3			3					
		5						5			
			26		12		9		5		
	Total	50	69		12		18		39		
III	Practicals	50									
ZH 301	a. Study of distinctive characters in the external morphologies	5	9	9							
	b. Study of exoskeletons	3	6	6							
	c. Study of skeleton and identification of skulls	5	9	9							
	d. Dissecting the body to reveal anatomical peculiarities	10	30			21		9			
ZH 302	Identifying important and common animals	12	30	15		15					
ZH 303	Outdoor animal watching	5	9	3		3		3			
	Total	50	93	42		39		12			

Department of Zoology (Honours)

PART II

SESSION 2016-2017

Paper-IV (Theory) : Genetics, Cell and Molecular Biology, Biochemistry and Biophysics (100)

Group A: Genetics, Cell Biology and Molecular Biology (50)

Group B : Biochemistry and Biophysics (50)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10)		OCT-DEC Weeks (6-8)		JAN-APR Weeks (10-12)		MAY-JUNE
				No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	
401	Genetics	20	27							Part I Examination Study leave and Counselling
	i) Significance of Mendel's experiments and laws, Concepts and examples of - Test Cross and Back Cross		3	3						
	ii) Incomplete Dominance/Codominance, Multiple Alleles		2	2						
	iii) Epistasis, Polygenic inheritance		2	2						
	iv) Chromosomal aberrations, gene mutations and human diseases		8	8						
	v) Sex chromosomes and sex-linked inheritance		3	3						
	vi) Linkage and Recombination – Types and outcome, linkage disequilibrium, 3-point cross	9	9							
	Total		27	27						
402	Cell Biology and Molecular Biology	30	40							
	i) Units of biological measurements and microscopy		3			3				
	ii) Plasma membrane		4			4				
	iii) introduction to structure and functions of mitochondria, GERL		4			4				
	iv) Cell Cycle		3			3				
	v) Replication		3			3				
	vi) Transcription		3			3				
	vii) Translation		3					3		
	viii) Gene expression-lac operon, trp operon								3	
	ix) Types of mutations		5						5	

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10)		OCT-DEC Weeks (6-8)		JAN-APR Weeks (10-12)		MAY-JUNE		
				No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures			
	x) Transposable genetic elements		3					3				
	xi) Genetic engineering		9					9				
	Total		40	20				20				
403	Biochemistry i) Chemical evolution of biomolecules ii) significance of water iii) Structural identities of biomolecules : Carbohydrates, Amino Acids, Peptides, Lipids, nucleic acids iv) Enzymes (major classes of enzymes-mode of actions and examples) and enzyme kinetics v) Metabolic pathways : Glycolysis, HMP shunt, Krebs' cycle, electron transfer system, Gluconeogenesis, Glycolysis, beta oxidation	30	40									
		Full Marks	2			2						
			2			2						
			15			4		11				
			6		Class Test			6		Periodical Examination	Study leave and Counselling	Part I Examination
			15					15				
	Total		40			8		32				
404	Biophysics i) Three-dimensional structure of proteins ii) Structure of nucleic acids iii) Chromosome structure including Nucleosomes iv) Introductory principles of common methods used in biochemistry and biophysics : Chromatography, Ultra-centrifuge, Electrophoresis, X-ray crystallography Immunoelectrophoresis & Western blotting	20	20									
			3					3				
			3			3						
			3			3						
			11					11				
			20			6		14				
	Total	100	127	27		34		66				

Department of Zoology (Honours)

Paper V (Theory): Taxonomy, Ecology, Biodiversity & Microbiology, Parasitology, Immunology (100)

Group A (50): Taxonomy and Systematics, Ecology and Biodiversity

Group B (50): Microbiology, Parasitology, Immunology

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10)		OCT-DEC Weeks (6-8)		JAN-APR Weeks (10-12)		MAY-JUNE	
				No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures		
501	Taxonomy and Systematics	10 Full Marks	15								
	i) Modern definitions of taxonomy and systematics, philosophy and working of modern taxonomy, Linnaean hierarchy,		4	4							
	ii) Concept of a species in taxonomic practice		3	3	Class Test						
	iii) ICZN and its important rules,		3	3							
	iv) Cladistics : simple introductory concept and examples		4	4							
	Total		15	15							
502	Ecology	25	30								
	i) Ecology of populations: survivorship curves, life history tables, age-sex pyramids, population growth models		6	6							
	ii) Ecology of communities		12	12							
	iii) Ecosystems ecology : trophic structure, energy flow, nutrient cycling		12			12					
	Total		30	18		12					
503	Biodiversity and Wildlife Conservation	15	25								
	i) Concept of biodiversity		2			2					
	ii) Importance of biodiversity		2			2					
	iii) biodiversity hotspots, India- a megadiversity country		4					4			
	iv) CBD		2					2			
	v) Indian Biodiversity Act		2								
	vi) Wildlife Conservation: Major forest types and their locations in India		3						3		

Department of Zoology (Honours)

Paper Units	Course Content	Mar ks	No. of Lectures	JUL-SEPT Weeks (9-10)		OCT-DEC Weeks (6-8)		JAN-APR Weeks (10-12)		MAY-JUNE	
				No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures		
504	vii) Major wildlife of India - their Indian distribution, present status		3					3			
	viii) conservation efforts (PAs- major sanctuaries and national parks, Indian Wildlife Act, IUCN categories, Project tiger as a case study)		6					6			
	Total		25			4		21			
504	Microbiology	15	16								
	i) The study of microbial structure	Full Marks	2	2	Class Test			Periodical Examination	Periodical Examination	Study leave and Counselling	Part I Examination
	ii) Microbial Nutrition		2	2							
	iii) Microbial growth		2	2							
	iv) Control of Microorganisms by Physical and Chemical agents		3	3							
	v) Pathogenicity of Microorganisms		1	1							
v) Human diseases caused by Virus (polio, avine influenza) Bacteria (cholera, tuberculosis), Fungi (ringworm)	6			6							
Total		16	10		6						
505	Parasitology	15	22								
	i) Concept of parasitism		2			2					
	ii) Origin and evolution of parasitism, host parasitic interactions,		5			5					
	iii) Parasitic adaptation: physiological, bio-chemical, Zoonosis, Myasis		5			5					
	iv) Identifying characters, life cycles, mode of infections of important parasites—Entamoeba, Giardia, Fasciola, Taenia, Ascaris		10					10			
Total		22				12		10			

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures	MAY-JUNE
506	Immunology	20	32				
	i) What is Immunology: a short preview of the development of the subject		1	1			
	ii) Innate (Nonspecific) and Acquired (Specific) immunity.		3	3			
	iii) Central dogma of Immune system: (a) Cells of Immune system (b) Organs of Immune system- Primary & Secondary lymphoid organs.		3	3			
	iv) Concept of Antigen & Antigen Presentation		3	3			
	v) The Major Histocompatibility Complex : Antigen processing & presentation		3	3			
	vi) Concept of T Cell- Antigen recognition and activation		4	4			
	vii) Concept of B Cell Activation and Antibody production		4	4			
	viii) Cytokines		4			4	
	ix) The Complement System		3			3	
	x) Techniques in Immunology: ELISA, RIA, Immunodiffusion Techniques		4			4	
		Full Marks	32	21	11		
	Total	100	140	64	45	31	
VI	Practicals (F. M. 100)	50	69				
	Group A						
	i) Pedigree analyses		8	12	12		
	ii) Statistical tests of data and decision making : Chi square test and student t test		8	12	12		
iii) Database preparation, analyses and graphical presentation by EXCEL in Microsoft/Open Office	7	12			12		

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures	MAY-JUNE
	iv) Ecological study : Sampling techniques in field ecology- Quadrat, Transects, Pitfall, Measuring species diversity of given sample of a community	12	15			15	
	v) Documentation of local fauna : documentation of different species found naturally in the localities around the college.	5	18	3	3	15	
	Total		69	27	15	27	
	Group B	50	72				
	i) Uses of microscope, stages and ocular microscope and camera lucida for cellular study	5	12	12			
	ii) Chromosome preparations : Onion root tip (mitotic stages), Grasshopper testes (meiotic stages) and Drosophila larvae (Polytene chromosome and imaginal disc)	15	18	15	3		
	iii) Biochemical tests : Qualitative tests for unknown carbohydrates and proteins, colorimetric assay of protein (Lowry's method) and glucose (Nelson and Somogyi method), Preparation of Buffers - PBS, TRIS-Cl,	20	42		18	24	
			72	27	21	24	
	Total	100		54	39	51	

Part I Examination

Study leave and Counselling

Periodical Examination

Periodical Examination

Class Test

Full Marks

Department of Zoology (Hons.)

PART III

SESSION 2016-2017

Paper-VII: Theory (100)

Animal Physiology, Endocrinology & Reproductive biology and Histology

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures	MAY-JUNE
701	Animal Physiology i) Transport across cell surface membrane, Donnan membrane equilibrium ii) Functions of mammalian blood : Oxygen transport and CO ₂ transport iii) Neurophysiology : Generation of action potential and propagation of nerve impulse in myelinated and non-myelinated nerve fibers. Synaptic and neuromuscular junctions : structure and functions iv) Respiration : gill respirations in fishes, respiration in air-breathing fishes, respiration in avian lungs v) General architecture of skeletal (striated) muscle and smooth muscle ; Ultrastructure of skeletal muscle sarcomere, molecular structure of actin and myosin, Muscle contraction: sliding filament theory vi) Swim bladder and its functions in teleost fishes vii) Water and osmotic regulations : problems in marine cyclostomes, elasmobranchs and teleosts, freshwater teleosts, in hot desert environments (camel) and examples of	40	50				
		Full Marks	6	6	6	6	
			6		6		
			4		4		
				Class Test		Periodical Examination	Periodical Examination
							Study leave and Counselling
							Part I Examination

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures	MAY-JUNE
	significant adaptations solving it by different animal groups		6			6	
	viii) Urine formation in human kidney		4			4	
	ix) Bioluminescence : occurrence, mechanism of production						
	Total		50	24	16	10	
702	Endocrinology and Reproductive biology	40	50				
	i) Classification of vertebrate hormones based on chemical nature and mechanism of action (names and examples only).	Full Marks	2	2	Class Test		
	ii) Hormone delivery systems : Endocrine, neuroendocrine, paracrine, neurocrine, autocrine (Definitions and examples only)		2	2			
	iii) Feed back control of hormone secretion : negative and positive.		2	2			
	iv) Hormone biosynthesis (including sites of synthesis, outlines only) : Thyroid hormones (T3, T4), testosterone, estrogen, progesterone, adrenocortical hormones, Insulin, Adrenal catecholamines.		15	15			
	v) Physiologic functions of hormones : Insulin, glucagon, T3 and T4.		6	6			
	vi) Hormonal control of spermatogenesis		3	3			
	vii) Hormonal control of mammalian ovarian cycle, differences between estrous and menstrual cycle.		4			4	
					Periodical Examination	Periodical Examination	Study leave and Counselling
							Part I Examination

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures	MAY-JUNE
	viii) Mechanism of hormone actions (outlines only) : cytoplasmic receptor, nuclear receptor, membrane receptor, HRE, HSP, cAMP, cGMP, IP3-DAG, tyrosine kinase, calcium-calmodulin		9		9		
	ix) Endocrine disorders (symptoms and causes only): Diabetes insipidus; IDDM & NIDDM, Hypothyroidism and hyperthyroidism, Conn's and Cushing's syndrome.		7		7		
	Total		50	30	20		
703	Histology i) Basic tissue types : epithelial, connective, cardiac and nervous tissue (typical structure of neuron and types of neuron, glial cells etc) ii) Membrane specializations of epithelia. (Inter-cellular surface [cell junctions], luminal surfaces and basal surfaces). iii) Exocrine glands : Types and discharge of secretory products (merocrine, apocrine, holocrine). iv) Principles of tissue fixation, staining v) Histology of: stomach, pancreas, testis, ovary, thyroid, lymph node. (Outline of structures). vi) Histological structure of mammalian nephron and functions of each regions.	20	30				
		Full Marks	6		6		
			3		3		
			3	Class Test	3		
			3			3	
			12			12	
			3			3	
	Total		130	54	48	28	
							Part I Examination Study leave and Counselling

Department of Zoology (Honours)

Paper VIII: Theory (100)

Developmental Biology, Environmental Pollutions and Toxicology, Medical Zoology and Economic Zoology

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR.	MAY-JUNE
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures	
801	Developmental Biology i) Outlines of historical concepts and experiments in the emergence of developmental biology—Induction, Fate map, Spemann and Mangold's organizer transplant experiments, von Baer's laws. ii) Germ layers and its contributions to the development of different tissues in vertebrates. iii) Origin of germ cells, Structural features of sperms and eggs in sea urchins and in mammals, Gametogenesis in mammals, iv) Fertilization : external fertilization in sea urchins, internal fertilization in mammals (in depth molecular details not required) v) Cleavage : Types of cleavage found in animals and animal groups that exhibit a type, outlines of cleavage process in C. elegans, Zebra fish and Xenopus and chick vi) Gastrulation : generalized patterns, brief outlines of the process in C. elegans, Zebra fish, Xenopus and chick vii) Organogenesis : development of brain in chicken viii) Conceptual outlines (very brief) of - Cell potency and Stem Cells,	30	42				
			3	3			
			3	3			
			6	6	Class Test		
			6	6		Periodical Examination	
			3	3			Periodical Examination
			9	9			
			3	3		3	
9	9			9			
		Full Marks					Part I Examination Study leave and Counselling

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10)		OCT-DEC Weeks (6-8)		JAN-APR Weeks (10-12)		MAY-JUNE	
				No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures		
	Sex determination in Drosophila and Man, Environmental sex determination in reptiles. HOX genes in development										
	Total		42	30		12					
802	Environmental Pollutions and Toxicology i) Environmental pollutions (nature and sources of pollutants, impacts on ecosystems and humans, remedies): water, soil, air and sound pollutions ii) Environmental laws : major ones applicable in West Bengal iii) Toxicology: including its significance as a branch of Science iv) Dose-response relationships v) In vivo and In vitro toxicity tests vi) Introduction to the concepts of detoxication mechanisms	20	26	12	3						
		Full Marks	2	2	Class Test			Periodical Examination	Periodical Examination	Study leave and Counselling	Part I Examination
			3			3					
			3			3					
			3			3					
	Total		26	17		9					
805	Medical Zoology i) Mosquito-borne diseases: Malaria and Filariacausative agents, their life cycle, modes of infections in man, major modes of treatments, major vector species in India, their ecology and life cycles, control measures ii) Mosquito-borne diseases: Dengue and DHF, Chikungunya-causative virus, symptoms and treatments	15	20	6	6						
			6			6					

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10)		OCT-DEC Weeks (6-8)		JAN-APR Weeks (10-12)		MAY-JUNE	
				No. of Lectures		No. of Lectures		No. of Lectures			
	iii) Visceral Leishmaniasis (Kala-azar)- causative species and vectors in West Bengal		6			4		2			
	iv) Common ticks and mites in human surroundings and diseases caused by them		2					2			
	Total		20	6		10		4			
806	Economic Zoology i) Fishes and fishery : diversity of indigenous freshwater, estuarine, marine fishes and shell fishes in West Bengal. Invasive and exotic species of fishes in West Bengal. Techniques of modern pisciculture and prawn culture. Problems related to wild prawn seed collections in Sunderbans, fish productivities in India and West Bengal, ecology and degradation of freshwater fish habitats and decrease in wild fish stocks (very brief idea) ii) Sericulture : silks and silk worms, sericulture practices- methods, scopes and problems iii) Apiculture : Honey bees and their behaviours in relation to bee-keeping popular methods of bee keeping, scopes and problems iv) Lac culture : Lac and lac insects, host plants and lac cultivation, scopes and problems	35	45 21		Class Test	6		15			
		Full Marks					Periodical Examination		Periodical Examination		Part I Examination Study leave and Counselling
			6			6					
			6			6					
			6			6					

Department of Zoology (Honours)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10)		OCT-DEC Weeks (6-8)		JAN-APR Weeks (10-12)		MAY-JUNE	
				No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures		
	v) Poultry birds: different breeds, their advantages and disadvantages, importance of indigenous breeds	Full Marks	3					3		Part I Examination Study leave and Counselling	
	vi) Cattle, goats and lambs: different breeds, their advantages and disadvantages, importance of indigenous breeds		3		Class Test			3	Periodical Examination		
			45			24		21			
Total		100	133	53		55		25			

Department of Zoology (General)

ACADEMIC CALENDAR

PART I

SESSION 2013-2014

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10)		OCT-DEC Weeks (6-8)		JAN-APR Weeks (10-12)		MAY-JUNE	
				No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures		
I	Theory (100) Nonchordates, Chordates, Parasitology & Endocrinology and Ecology, Ecosystem & Environment Group A : Nonchordates 1. Classification with distinctive features and suitable examples of sub kingdom Protozoa (upto Phyla) and Phylum Porifera, Cnideria, Platyhelminthes, Nematelminthes, Annelida, Arthropoda, Mollusca and Echinodermata (upto Sub class). 2. General structure and function of the following with reference to the specimens mentioned :	30	30							Part I Examination Study leave and Counselling	
		Full Marks	5	5	Class Test			Periodical Examination	Periodical Examination		

Department of Zoology (General)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR	MAY-JUNE			
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures				
	i) Locomotion : a) Microfibrils (Amoeba), b) Cilia (Paramecium), c) Parapodia (Nereis).	Full Marks	3	3	Class Test	Periodical Examination	Periodical Examination	Study leave and Counselling	Part I Examination	
	ii) Feeding and digestion: a) Microphagy (Amoeba), b) Macrophagy (Hydra), c) Filter feeding (Balanoglossus)		4	4						
	iii) Respiration: a) Ctenidium and Pulmonary sac (Pila), b) Trachea and Booklung (cockroach, scorpion).		4	4						
	iv) Excretion : a) Flame cell (Tadpole), b) Nephridia (Earthworm), Malpighian tubules (Cockroach)		3							3
	v) Circulation : a) Open circulation (Cockroach), b) Closed circulation (Earthworm), Haemal circulation (Starfish)		4							4
	vi) Neural integration : a) Integration – simple and complex nerve nets b) Nervous system (Earthworm, Cockroach, Apple snail)		3							3
	vii) Reproduction and Life cycle : a) Fission (Amoeba), b) Conjugation (Paramecium), c) Sexual (Earthworm), d) Metagenesis (Obelia), e) Metamorphosis in insects		4							4
	Total									16

Department of Zoology (General)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR	MAY-JUNE		
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures			
	Group B : Chordates 1. Classification of Phylum Chordata with distinctive features and suitable examples – Fishes and Aves (upto Sub class); Amphibia, Reptilia and Mammalia (upto living orders). 2. a) Functional anatomy in relation to filter feeding (Branchiostoma); circulation with special reference to portal system. b) Structure and function of the following : i) Integument - general structure and function; glands in general and integumentary derivatives (scales in fishes; horny scales and plates in reptiles; feathers of birds; hair of mammals). ii) Digestive system — pharynx (Ascidia); stomach (Columba and Bos). iii) Respiratory system — gills (fish); accessory respiratory organs (fish); lungs (birds and mammals). iv) Excretory system—pro-, meso- and meta-nephric kidneys in vertebrates. v) Circulatory system – single circuit heart (fish); double circuit heart (amphibia and mammals); modification of aortic arches in vertebrates. vi) Nervous system — Brain of Bufo; origin and distribution of cranial nerves in vertebrates.	30	30	5					
		Full Marks	3	3	Class Test		Periodical Examination		
			4	4			Periodical Examination		
			4	4		4			
			3			3			
			4			4			
			3			3			
	Total		30	16		14			

Part I Examination
Study Leave and Counseling

Department of Zoology (General)

PART II

SESSION 2016-2017

Paper II Theory (100)

**Evolutionary Biology, Cell & Molecular Biology, Developmental Biology and
Physiology & Biochemistry**

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR	MAY-JUNE	
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures		
	Group A : Evolutionary Biology 1. Definition of Systematics and Taxonomy. 2. Species as unit of evolution (definition and types : biological, monotypic and polytypic). 3. Chemical basis of origin of life. 4. Darwinism and synthetic theory of evolution. 5. Hardy-Weinberg equilibrium in relation to natural selection – a brief idea. 6. Anatomical and physiological adaptation : aquatic, desert and volant animals. 7. Zoogeographical realms and their subdivisions with characteristic fauna.	30	30					
		Full Marks		Class Test		Periodical Examination	Periodical Examination	Part I Examination Study leave and Counselling
			3	3				
			4	4				
			4	4				
			4	4				
			3		3			
			6		6			
			6		6			
	Total		30	15	15			
	Group B : Cell and Molecular Biology 1. Ultrastructure and function of plasmamembrane, GERL system and ribosome. 2. Chromosome structure-nucleosome model. 3. Cell cycle (basic idea). 4. Physico-chemical structure and properties of DNA and RNA. 5. Nucleic acids as genetic material.	30	30					
			3	3				
			2	2				
			2	2				
			2	2				
			2	2				

Department of Zoology (General)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10)		OCT-DEC Weeks (6-8)		JAN-APR Weeks (10-12)		MAY-JUNE	
				No. of Lectures		No. of Lectures		No. of Lectures			
	6. Mechanism of replication, transcription and translation in E. coli 7. Modes of inheritance of autosomal and sex-linked genes in man; Thalassaemia and Haemophilia. 8. Linkage and recombination. 9. Point mutation and changes in chromosome number with reference to chromosomal aberrations. Down syndrome and Klienfelter syndrome. 10. Sex determination in Drosophila and man.	Full Marks	6			6					
			3			3					
			3			3					
			3		Class Test	3					
			4						Periodical Examination		
	Total		30		11		15		4		Periodical Examination
	Group C : Developmental Biology	20	20								
	1. Spermatogenesis and oogenesis.		5						5		
	2. Fertilization in sea-urchin.		3						3		
	3. Types of eggs and cleavage; process of cleavage in frog and chick		3						3		
	4. Gastrulation in frog and chick		6						6		
	5. Placentation in mammals.	3						3			
	Total		20					20			
	Group D : Physiology and Biochemistry	20	20								
	1. Formed elements in vertebrate blood; clotting and coagulation; ABO blood group and Rh factor.		3						3		
	2. Enzyme-classification and characteristics; mechanism of enzyme action; effects on enzymes action (substrate	5						5			

Department of Zoology (General)

Paper Units	Course Content	Mar ks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR	MAY-JUNE	
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures		
	concentration, pH and temperature). 3. Classification of carbohydrate, protein and lipid; Concept of glycolysis and Kreb's cycle. 4. Neoglucogenesis. 5. A brief idea on muscle contraction. 6. Physiology of nerve impulse and synaptic transmission and neuro-muscular junction.		6			6		
			1			1		
			2			2		
			3			3		
	Total	100	100	26	30	44		
III	(Practical, 100 marks)							
Dissec- tion	1. Dissection Cockroach-Digestive, nervous and female reproductive system Tilapia (Oreochromis sp) – urinogenital system and brain,		24 12	12				
			12		12			
Moun- ting and prepa- ration	2. Mounting and prepara- tion: a) Mouth parts of cockroach. b) Setae of earthworm. c) Cycloid, ctenoid and placoid scales. d) Blood film of rat and haemolymph of cock- roach (Leishman/Giemsa stain). e) Gut content of cock- roach for parasites. f) Whole mount of aquatic micro-arthropods. g) Epithelial cells from buccal smears.	Full Marks	21					
			3	3				
			3	3				
			3	3				
			3	3		3		
			3			3		
			3			3		
Identi- fica- tion	3. Identification with reasons : a) Bones : Skull, vertebrae, limb and girdle bones of Columba and Cavia.		42					
			12	12				

Periodical Examination

Periodical Examination

Study Leave and Counselling

Part I Examination

Class Test

Department of Zoology (General)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10)		OCT-DEC Weeks (6-8)		JAN-APR Weeks (10-12)		MAY-JUNE	
				No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures	No. of Lectures		
Field Study	b) Histological slides : T.S. of mammalian ileum, lung, liver, pancreas, testis, ovary, kidney and thyroid.	Full Marks	6			6					
	c) Non-chordate specimens: Amoeba, Plasmodium, Paramecium, Scypha, Obelia, Sea-anemone, Ascaris, Leech, Centipede, Milipede, Scorpion, Lamellidens, Achatina, Loligo, Starfish, Balanoglossus.		12					12			
	d) Chordate specimens : Ascidia, Branchiostoma, Petromyzon, Scoliodon, Anabas, tree frog, Axototl larva, Tylotriton, Gecko, Hemidactylus, Mabuia, Turtle, Naja, Chiroptera.		12		Class Test				12		
	4. Report on field study tour : Any one (1) site of Zoological importance: (Zoo-garden, Museum, Sericulture centre, Apiculture centre, Fisheries, Agricultural firm or such places).		9					9			
	Total	100	96	36		27		33			

Part I Examination
Study leave and Counselling

Periodical Examination

Periodical Examination

Department of Zoology (General)

PART III

SESSION 2016-2017

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures	MAY-JUNE	
IV	<p>A Theory (60) Aquaculture Principles, definition and scope. Fisheries resources of India (inland and off-shore). Exotic fishes – their merits and demerits. Induced breeding and its importance. Basic principles of different aquaculture system (Polyculture and Integrated farming). Marine pearl culture, culture of prawn and shrimps. Sericulture–Characteristics of sericulture industry and its scope; kinds of silk worm, host plants. Life history and rearing of Bombyx mori, harvesting and processing of cocoon, reeling and extraction of silk; pest on mulberry plants and diseases of Bombyx mori and control measures. Apiculture – Types of honey bees, modern methods of apiary management, products and its uses. Problems and prospects. Pest and Pest Management – Pest - definition, types, life history and control i) Scirpophaga, ii) Sitophilus and iii) Bandicoota, Concept on IPM. Poultry and Poultry Management–Duck and fowl - Types of breeds, rearing and disease management.</p>	Full Marks	10	10				
			6	6	Class Test			
			6			6	Periodical Examination	
			6			6	Periodical Examination	
			2			2		Study leave and Counselling
								Part I Examination

Department of Zoology (General)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR	MAY-JUNE	
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures		
	Wild life and Biodiversity - 1. Conservation of Wild life - Importance and strategies, Concept of Biosphere Reserve, National Park and Wild life Sanctuary. 2. Basic concept of Biodiversity, Biodiversity hotspot. 3. Endangered Indian mammals, Animal Cruelty Prevention Act. Biotechnology and Immunology - 1. Basic concept of genetic engineering and cloning; 2. Concept of immunity; 3. Outline structure and classification of immunoglobulin; antigen-antibody reaction; 4. Basic principle of vaccination.	Full Marks	14					
			6		6			
			4				4	
			4				4	
			12		Class Test			Periodical Examination
			6				6	
		4				4		
		2				2		
	Total		56	16	20	20		Part I Examination Study Leave and Counselling
IVB	(Practical, 40 marks)							
Experimental works	1. Experimental works :		30					
	i) Estimation of dissolved O ₂ content of water.		3	3				
	ii) Estimation of dissolved free CO ₂ content of water.		3	3				
	iii) Pedigree analysis : sex-linked recessive, autosomal recessive and dominant.		9	9				
	iv) Determination of ABO blood group and Rh factor.		3		3			
	vii) Measurement of pH of water.		3		3			
	viii) Sampling of zooplankton and extraction of soil micro-arthropods.		3		3			

Department of Zoology

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR	MAY-JUNE	
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures		
	ix) Tests for food colors/ adulteration : mustard oil red chili powder, turmeric powder, toxic colors in vegetables/ sweets.	Full Marks	6		6			
	2. Field excursion : (submit report of field excursion at any one place from below) i) Estuarine/ freshwater fish farm. ii) Poultry centre. iii) Apiary. iv) Sericulture centre. v) Places of wildlife interest (sanctuary, national park, biosphere reserve etc) vi) Agricultural farms for pest study and idea of IPM practices. vi) Species diversity studies in forest ecosystem/coastal regions.		9			9		
	3. Identification : (write specimen characters, scientific name and applied importance) <i>Plasmodium</i> , <i>microfilaria of Wuchereria bancrofti</i> , <i>Taenia solium</i> , <i>Scirpophaga insertulas</i> , <i>Sitophilus oryzae</i> , <i>Leucinodes orbonalis</i> , <i>Anomis sabulifera</i> , <i>Bombyx mori</i> , <i>Lepisma</i> , <i>Termite</i> , <i>Bandicoota bengalensis</i> , <i>Labeo rohita</i> , <i>L. bata</i> , <i>Catla catla</i> , <i>Cirrhinus mrigala</i> , <i>Hypophthalmichthyes molitrix</i> , <i>Cyprinus carpio</i> , <i>Ctenopharyngodon idella</i> , <i>Lates calcarifer</i> , <i>Temialosa ilisha</i> , <i>Penaeus monodon</i> , <i>Macrobrachium rosenbergi</i> .		15	Class Test	6	Periodical Examination	9	Periodical Examination
	Total		54	15	21	18		

Department of Microbiology (UG)
TEACHING PLAN

SESSION 2016-2017
(1+1+1 System) Degree Course Microbiology (Honours) [MCBA]

PART-I

Paper Units	Course Content	Marks	No. of Lectures (6-7/weeks)	JUL-DEC (14-16 weeks)	JAN-APRIL (10-12 weeks)	Periodic Examination	Test Examination Part-I
				No. of Lectures	No. of Lectures		
I		100					
	Group : A	50	06	84-96	60-72		
	Biomolecules (85)^a						
	Bonding Features (10) Stereochemistry (15) Carbohydrates (10) Amino acids, Peptides and Proteins : (i) Amino acids and Peptides (10) (ii) Proteins (15) Lipids (10) Nucleic acid (15)						
	Group : B	50	04	56-64	40-48		
Biomolecules (45)^a							
	Physico-Chemical properties of water (5) Thermodynamics and its application to biological systems (15) Spectrometry (10) Microscopy (5) Fundamentals of radioactivity (10)						
	Total No. of Classes (130)		10	140-160	100-120		
II		100					
	Group : A General Microbiology (85)^a Notable contributions in the development of Microbiology (3) Position of microorganisms in biological world (7) Stains and staining techniques (10) Bacterial morphology and sub-cellular structures (20) Eukaryotic microbes (10) Microbial Nutrition (10) Bacterial Growth (10) Control of growth of microbes (15)	50	06	84-96	60-72		

Paper Units	Course Content	Marks	No. of Lectures (6-7/weeks)	JUL-DEC (14-16 weeks) No. of Lectures	JAN-APRIL (10-12 weeks) No. of Lectures	
II	(Continued)		06	84-96	60-72	Test Examination Part-I
	Group : B	50				
	Practical (72) ^a					
	1. Qualitative tests of Reducing and non-reducing monosaccharide and disaccharides, Polysaccharides, amino acids (identification of specific amino acids not required). Proteins (Beret method), cholesterol. (8)					
	2. Quantitative estimation of reducing sugar by 3, 5 Dinitrosalicylate methods, DNA and RNA by UV spectroscopy and protein by Biuret method (8)					
	3. Estimation of amino acid by formol titration. (4)					
	4. Operation of light microscope ; use of oil immersion objective. (4)					
	5. (a) Preparation of culture media. (10)					
	(b) Cultivation of microorganisms. (18)					
	(c) Staining techniques for examination of microorganisms. (20)					
	Total No. of Classes (157)		12	168-192	120-144	

PART-II

III		100	04	56-64	Periodic Examination	40-48	Test Examination Part-II
	Group : A	50					
	Cellular and molecular biology (75) ^a						
	Eukaryotic cell biology (30)						
	Cell Biology of yeast DNA replication (15)						
	Transcription in prokaryotes (15)						
	Mechanism of translation in prokaryotes (15)						

Paper Units	Course Content	Marks	No. of Lectures (6-7/weeks)	JUL-DEC (14-16 weeks) No. of Lectures	JAN-APRIL (10-12 weeks) No. of Lectures	
III	(Continued)		06	84-96	60-72	Test Exam. Part-II
	Group : B	50				
	Metabolism and Bioenergetics (65)^a					
	Enzyes (25) Carbohydrate metabolism (25) Amino acid metabolism (10) Lipid metabolism (5)					
	Total No. of Classes (140)		12	140-160	100-120	
IV		100	04	56-64	40-48	Test Examination Part-II
	Group : A	50				
	Environmental and Food Microbiology (55)^a					
	Air Microbiology (5) Microbiology of water (10) Soil microbiology (25) Food Microbiology (15) (i) Preservation of food (ii) Microbiologically fermented food					
	Group : B	50	06	84-96	60-72	
	Practical (~75)					
	1. Isolation of pure culture from natural sources. (36) 2. Microbiological examination of water : (Drinking water, supply water, pond water) : (15) a) Presumptive test b) Confirmatory test c) Completed test for coliform (ii) IMVIC reactions 3. Microbiological examination of milk : By Methylene-blue dye raduction test. (06) 4. Microbiological assay of antibiotics 5. Micrometry : (06) Microscopic measurements of Yeast. 6) Enumeration of Microbes : (06) Yeast by haemocytometer. 7. Bacterial growth curve by nephelometric method (<i>E. coli</i>). (12)					
	Total No. of Classes (136)		10	140-160	100-120	

PART-III

Paper Units	Course Content	Marks	No. of Lectures (6-7/weeks)	JUL-DEC (14-16 weeks) No. of Lectures	JAN-APRIL (10-12 weeks) No. of Lectures		
V		100					
	Group : A	50	05	70-80	-		
	Genetics and Biometry (50)^a						
	Principles of elementary genetics (15) (i) Mendelian genetics (ii) Structure of prokaryotic gene Genetic exchange and recombination (15) (i) Transformation & Conjugation (ii) Transduction (iii) Recombination (iv) Transposable elements Mutation and Repair (10) (i) Mutation (ii) Repair Biometry (10)						
	Group : B	50	04	56-64	-		
	Industrial Microbiology and Recombinant DNA Technology (60)^a						
	Industrial Microbiology (25) Microbial culture selection by screening method..... Fermentation.... Separation assay and purification of products-general discussion). Concept of Primary and Secondary metabolites in Microorganisms. General method of preservation of industrially important culture strains. Recombinant DNA Technology (35) Isolation and purification of nucleic acid.... Cloning of gene, restriction and modification enzymes.... Basic differences between cloning and expression vector.... Construction of Genomic and c DNA library Enzymes and in RDT						
	Total No. of Classes (136)		09	126-144	-		

Periodic Examination

Test Examination Part-III



Paper Units	Course Content	Marks	No. of Lectures (6-7/weeks)	JUL-DEC (14-16 weeks) No. of Lectures	JAN-APRIL (10-12 weeks) No. of Lectures		
VI		100					
	Group : A	50	04	56-64	-	Periodic Examination	Test Examination Part-III
	Virology and Medical Microbiology (60)^a						
	Virology (25) Medical Microbiology (20) Common Microbial Disease (15)						
	Group : B	50	03	42-48	-		
Immunology (60)^a							
	Overview of the Immune system (2) Cells and organs of Immune system (10) Type of Immunity (14) Antigens (6) Immunoglobulin (8) Antigen-Antibody interactions (5) Complement (6) Hypersensitivity (2) Vaccines (7)						
	Total No. of Classes (120)		07	98-112	-		
VII		100					
	Practical (48-60)		06	84-96	-	Periodic Examination	Test Examination Part-III
	1. Separation of Amino Acids and monosaccharide by paper chromatography and by TLC.						
2. Standard curve of : (i) Reducing sugars (ii) Paranitrophenol (iii) Protein (Bradford and Lowry) (iv) Ammonia (Nessler method)							
	3. (a) Determination of K_m , V_{max} and pH optima of α -amylase. Alkaline phosphatase and urease. (b) Progress curve of alpha - amylase. Alkaline phosphatase and urease. (c) Inhibitory study of alkaline phosphatase (by inorganic phosphate)						
	4. Industrial Visit.						
	Total No. of Classes (48-60)		06	84-96	-		

Paper Units	Course Content	Marks	No. of Lectures (6-7/weeks)	JUL-DEC (14-16 weeks) No. of Lectures	JAN-APRIL (10-12 weeks) No. of Lectures		
VIII		100					
	Practical (48-60)		06	84-96	-	Periodic Examination	Test Examination Part-III
	1. Antigen-Antibody reaction : (a) Agglutination (blood typing) (b) Ouchterlony's agar diffusion method. (c) Single radial immunodiffusion (Mancini's method). (d) Immunoelectrophoresis 2. Isolation of plasmid DNA from <i>E. coli</i> by using a standard method : Gel-electrophoresis (Agarose-gel), quantification and estimation of purity of DNA. 3. Transformation of <i>E. coli</i> by plasmid DNA (CaCl ₂ method). 4. Conjugation experiments. 5. Plaque assay of bacteriophage.						
	Total No. of Classes (48-60)		06	84-96	-		

a = No. of classes as per WBSU Curriculum.

Numerals in the first bracket indicate no. classes per topic as per WBSU curriculum.

Department of Microbiology (UG)
TEACHING PLAN

SESSION 2016-2017¹
(1+1+1 System) Degree Course Microbiology (Honours) [MCBG]

PART-I

Paper Units	Course Content	Marks	No. of Lectures (6-7/weeks)	JUL-DEC (14-16 weeks) No. of Lectures	JAN-APRIL (10-12 weeks) No. of Lectures		
I		100					
	Group : A	50	03	42-48	30-36	Test Examination Part-I	
	General Microbiology (61)^a						
	1. Basic Microbiology : Landmark of Microbiology in 20 th century (04) Major contribution of scientists (04) Scope of Microbiology (02) Whittaker's five kingdom concept.... (06) Eudacterial classification up to family (06) Cell structure & sub cellular organelles (12)						Periodic Examination
	2. Microscopy (06) 3. Stains & staining (08) 4. Cultivation of bacteria (13)						
Group:: B	50	02	28-32	20-24			
Virology, Microbial Growth, Metabolism & Control of Microbes (61)^a							
1. Virology (10) 2. Growth of Bacteria (05) 3. Control of Microbes (12) 4. Introduction to Biomolecules (06) 5. Bacterial Metabolism (21) 6. Biological N ₂ Fixation (07)							
Total No. of Classes (122)			05	54-80	50-60		



Paper Units	Course Content	Marks	No. of Lectures (6-7/weeks)	JUL-DEC (14-16 weeks) No. of Lectures	JAN-APRIL (10-12 weeks) No. of Lectures		
III		100	06	84-96	60-72	Periodic Examination	Test Examination Part-I
	Group : A	50					
	General Microbiology (85) ^a						
	1. Microscopy-Description & Operation of Compound Microscope (03) 2. Sterilization (03) 3. Culture Media Preparation (09) 4. Aseptic Techniques (09) 5. Isolation of Pure Culture by Streak Plate Method (06)						
	Total No. of Classes (122)		06	84-96	60-72		

PART-II

II		100	03	42-48	30-36	Periodic Examination	Test Examination Part-II
	Group : A	70					
	Environmental & Food Microbiology (84) ^a						
	1. Air Microbiology (05) 2. Water Microbiology (15) 3. Soil Microbiology (20) 4. Microbial Flora of Fresh Food (10) 5. Microbial Spoilage of Food (06) 6. Microbiological Examination of Food (04) 7. Preservation of Food (12) 8. Microbiologically Fermented Food (12)						
	Group : B	30	02	28-32	20-24		
	Applied Microbiology (36) ^a						
	1. Industrial Microbiology (20) 2. Recombinant DNA Technology (16)						
	Total No. of Classes (120)		05	54-80	50-60		

Paper Units	Course Content	Marks	No. of Lectures (6-7/weeks)	JUL-DEC (14-16 weeks) No. of Lectures	JAN-APRIL (10-12 weeks) No. of Lectures	
III		100	06	84-96	60-72	Test Examination Part-III
	Practical (78)					
	1. Aseptic Techniques (09) 2. Culture Techniques (09) 3. Isolation of Pure Culture by Streak Plate Method (06) 4. Viable Count of Bacteria by Serial dilution & Pour Plate Method (09) 5. Turbidometric Measurement of Bacterial Growth (12) 6. Bacteriological Examination of Drinking Water (15) 7. Methylene Blue Dye Reduction Test of Milk Samples (06)					
	Total No. of Classes (78)		06	84-96	60-72	

a = No. of classes as per Calcutta University Curriculum.

Practical Examination for Paper-III is held at the end of 2nd Year. Distribution of marks for Practical Examination as per West Bengal State University, Barasat is :

Assessment Procedure	Internal Assessment			Viva voce (to be taken by the External Examiner)	Total
	Attendance in the practical classes	Performance in the practical classes	Laboratory Note Book		
Marks	40	30	10	20	100

Department of FNTA
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PART I

Paper I: (unit I+II) 100 marks Human Nutrition & Food Science	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	JAN-APR (10-12) Weeks	
Human nutrition (50 marks)				
Concept, definition of the terms "Nutrition", "Malnutrition" and "Health". Brief history of nutrition science. Basic concept, definition of terms related to nutrition.	3	3		
Minimum nutritional requirement RDA. Formulation of RDA. Dietary guidelines. Reference Man, Reference Woman. Drawbacks of RDA.	3	3		
Energy in human nutrition : Idea of energy and its unit. Energy balance. Deficiency, excess of energy. BMR. Factors influencing BMR. SDA.	4	4		
Concept of Body composition : Body composition at different level. Brief idea about "Body composition and its change through life cycle".	3	3		
Physiology of pregnancy : Nutritional requirement during pregnancy and modification of existing diet. Antenatal care and schedule. Deficiency of nutrient (energy, protein, iron, folic acid, calcium, iodine) and its impact on pregnancy. Non-nutritional factors affecting pregnancy outcome. Importance of adequate weight gain during pregnancy. Adolescent pregnancy. Common complications during pregnancy (nausea, vomiting, pica, hypertension, obesity, food aversions, diabetes etc).	9	9		
Nutritional requirement during lactation. Dietary management. Hormonal control of lactation. Preparation for lactation. Breast feeding. Colostrum, its composition and its importance in feeding. Basic principles of breast feeding. Advantages and complications of breast feeding. Galactagogue.	6		6	
Nutritional requirement during infancy. Advantages of exclusive breast feeding during infancy. Duration of breast feeding. Introduction to supplementary foods. Initiation and management of weaning. Preparation of formula. Bottle feeding. Mixed feeding. Artificial feeding. Circumstances at which bottle feeding is to be given. Nutritional problems during infancy and practical approaches to combat the problem.	6		6	

Periodic Exam

Test Exam Part -I



Paper I: (unit I+II) 100 marks Human Nutrition & Food Science	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	JAN-APR (10-12) Weeks
Nutritional requirement and management of preterm and low birth weight baby. Feeding problems LBW baby.	3		3
Nutritional requirement and management of toddlers, pre-school, school going children, adolescents. Common nutritional problems of pre-school, school going children, adolescents.	9		9
Concept of growth chart. Use of growth chart.	2	2	
Total	48	24	24
Food science (50 marks)			
<u>Carbohydrate :-</u> classification, structure, properties, digestion, absorption, function, deficiency and excess	10	10	
<u>Protein :</u> classification, structure, properties, digestion, absorption, function, deficiency and excess	10	10	
<u>Lipids :-</u> classification, structure, properties, digestion, absorption, function, deficiency and excess	10	10	
<u>Dietary fibre :-</u> classification, properties, function, deficiency and excess	2	2	
<u>Vitamins:-</u> classification, structure, absorption, function, deficiency and excess	10		10
<u>Minerals:- :-</u> classification, absorption, function, deficiency and excess	8		8
<u>Water:-</u> properties, function, deficiency and excess, water balance	4		4
Total	54	32	22
Paper II: (unit I+II) 100 marks Human physiology Physiology practical			
Human physiology (50 marks)			
Introductory studies on structure and function of cells: Nucleus, cell membrane, mitochondria, golgi body, ribosome, lysosome, endoplasmic reticulum.	2	2	
Introductory studies on structure and function of tissues: connective tissue, epithelial tissue.	1	1	

Periodic Exam

Test Exam Part - I

Paper II: (unit I+II) 100 marks Human physiology & Physiology practical	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	JAN-APR (10-12) Weeks
Blood : and its composition. Blood group, Rh factor. Blood clotting. Basic mechanism of blood clotting. Blood transfusion.	4	4	
Cardiovascular system : Anatomical structure of heart. Brief idea about circulation. Cardiac cycle. Heart rate and factors affecting it. Cardiac output and factors affecting it. Blood pressure, factors affecting it.	6	6	
Gastro-intestinal system : Anatomical structure and function of GI system.	2	2	
Reproductive system : Anatomical structure and function of sex organs. Spermatogenesis. Oogenesis. Role of hormones. Menstrual cycle. Pregnancy. Parturition. Lactation. Menopause.	5	2	3
Excretory system : Structure and function of kidney. Brief idea about the role of kidney in homeostasis. Formation of urine. Normal and abnormal constituents of urine. Role of skin in regulation of body temperature.	5	2	3
Respiratory system : Brief idea about respiratory system. Different capacities and volumes. Mechanism of respiration. Transport of O ₂ and CO ₂ in blood. Acclimatization. Respiratory dead space.	5	2	3
Nervous system : Elementary idea about anatomy of Nervous system. Introductory idea about central nervous system, peripheral nervous system, autonomic nervous system. Regulation of hunger, thirst. Anatomical structure of eye.	6	4	2
Musculo-skeletal system : Anatomical structure and function of skeletal, smooth and cardiac muscle. Mechanism of muscle contraction. Histology of bone and teeth. Anatomical structure of teeth.	4	1	3
Endocrine system : brief idea and definition of endocrine secretion. Different glands and their secretions: Pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, sex hormones. Excess and deficiency symptoms.	7	5	2
Physiology practical (50 marks)			
Measurement of blood pressure and pulse rate.	4	3	1
Determination of Haemoglobin by Sahli's method.	3	2	1
Preparation of blood film and identification of WBC.	6	4	2
Determination of bleeding time and clotting time of blood.	3	2	1
Blood grouping.	4	2	2
Identification of prepared slides (13)	24	14	10
Total	91	53	33

Periodic Exam

Test Exam Part -I



Paper III: (unit I+II) 100 marks Community nutrition, Public health epidemiology	No. of Lectures (7-8) Weeks	JUL-DEC. (12-14) Weeks	JAN-MARCH (8-10) Weeks	
COMMUNITY NUTRITION				
Introduction to community nutrition : Concept of community. Characteristics of community, Types of community. Different factors affecting health of the community (like social, cultural, economic, political and environmental factors).	2	2		
Direct nutritional assessment of human : Nutritional anthropometry, Clinical signs, Biochemical and Biophysical methods.	4	4		
Nutritional Anthropometry : its need and importance in brief. Parameters of nutritional anthropometry and techniques of measurement. Growth chart and its usage.	3	3		
Clinical Signs : its need and importance in brief. Clinical signs of PEM, vitamin A deficiency, IDD, Anaemia.	6	6		
Diet Survey : its need and importance in brief. Important factors for diet survey in brief (like trained personnel, sampling, method etc). Different methods for conducting diet survey. Concept of consumption unit. Adequacy of diet with respect to RDA. Food security.	4	4		
Malnutrition : its sociological factors. Food production and availability, socio-economic factor, cultural influence, food consumption, population problem with respect to food production and availability, medical and educational services, psychological factor, emergency and disaster condition. Prevention of malnutrition.	4	4		
Concept of surveillance : food and nutrition surveillance, need for surveillance, objectives of surveillance, indicators of nutritional surveillance, importance and use of surveillance	3		3	
International, national, regional Agencies and Organisations : WHO, FAO, CARE, UNICEF, International Red Cross, NIN, ICMR, ICAR, CFTRI, FNB, NNMB, Indian Red Cross, CSWB, Nutrition Foundation of India.	8		8	
Nutritional intervention program to combat malnutrition.	5		5	
Nutrition Education : (elementary idea) Reason for Nutrition Education, objectives.	4		4	
Total	43	23	20	

Periodic Exam

Test Exam Part - II

Paper III: (unit I+II) 100 marks	No. of Lectures	JUL-DEC.	JAN-MARCH
Community nutrition, Public health epidemiology	(7-8) Weeks	(12-14) Weeks	(8-10) Weeks
Public health epidemiology(50marks)			
Health & its dimensions:- definition of health, different dimension of health. Positive health versus absence of disease.	2	2	
Secondary sources of community health data :- Sources of relevant vital statistics of infant. Child & maternal mortality rate. Brief idea about of epidemiology of nutritionally related diseases (amoebiasis, hyperlipidaemia, clotting disorder, beriberi, rotavirus infection).	4	4	
Public health & epidemiology :- definitions, Components of epidemiology and aims, different tools & measurements of epidemiology. Brief idea about epidemics. Epidemiological methods: analytical epidemiology-case control & cohort study, epidemics and its types, vital statistics, epidemiological triad, demography and life expectancy.	5	5	
Communicable & infective disease control :- definitions related to communicable diseases. Infection, contamination, decontamination, disinfection, transmission (direct & indirect) brief idea about different vector borne diseases- brief idea about AIDS, malaria, poliomyelitis, dengue, tuberculosis, MMR, chicken pox, pertussis, chikungunya, epidemiological principles of disease prevention and control.	10	10	
Immunization :- Definition. Host defenses and immunity. Immunizing agents: its types. National immunization schedule- its importance. Immunization for adults & foreign travelers. Hazards of immunization. Health advice to the foreign travelers.	6	4	2
Community water & waste management : Importance of water to the community. Sources of water. Concept of water pollution. Purification of water in small & large scale. Drinking water handling & safe drinking water. Water borne diseases (diarrhea, dysentery, arsenic toxicity). Waste - Types and methods of disposal, sewage disposal and treatment, Treatment and disposal technologies of health care wastes.	7		7
Community food protection :- Epidemiology of food borne diseases. Mode of transmission. Prevention & control (Salmonellosis, Shigellosis, typhoid, botulism, Cholera, E.coli food poisoning, Staphylococcal food poisoning).	7		7
Total	41	25	16

Periodic Exam

Test Exam Part -II



Paper IV :(unit I+II) 100 marks Food commodities, Community nutrition practical	No. of Lectures (7-8) Weeks	JUL-DEC. (12-14) Weeks	JAN-MARCH (8-10) Weeks	
Food commodities (50 marks)				
Cereals & their products : - Structure, nutritive value of cereals. Rice -composition, processing, Brief idea about different fermented rice products. Wheat: - composition, processing. Brief idea about different wheat products - millet like Jowar, Ragi, Bajra. Role of cereals in cookery. Gelatinization, Gluten formation. Breakfast cereal.	8	8		
Pulses : - composition, nutritive value, processing (soaking, germination, fermentation). Toxic constituent present in pulses. Pulse cookery. Factors affecting cooking quality. Role of pulses in cookery.	3	3		
Milk and milk products : - composition of milk. Nutritive value of milk. Physical properties of milk. Pasteurization of milk. Microbial spoilage of milk. Effect of enzyme, acid and heat on milk. Role of milk in cookery. Different fermented milk products like cheese, butter, curd. Brief idea about different non fermented milk products like ice cream, skimmed milk, toned milk, double toned milk, sweetened condensed milk, recombined milk etc.	8	8		
Egg : - Structure, nutritive value, composition. Effect of heat on egg, and factors affecting coagulation of egg protein. Hard and soft egg. Egg foaming and factors affecting egg foaming. Preservation of egg. Role of egg in cookery.	2	2		
Meat, Fish, Poultry :- classification of meat. Nutritive value of meat. Ageing, tenderization, artificial tenderization, curing of meat. Smoking of meat Fish:- composition, nutritive value, selection .spoilage of fish. Poultry:-processing, classification, composition.	4	4		
Vegetables and Fruits :- classification of Vegetables. Nutritive value, composition of vegetables. vegetable cookery. Effect of cooking on pigments present in vegetables. Loss of nutrient during cooking. Prevention of loss of nutrient. Storage of Vegetables. Classification of Fruits. Nutritive value, composition of Fruits. Pigments present in fruit. Bitterness in fruit. Ripening of fruits: Browning reaction.	6	4	2	
Sugar and its products : - Properties of sugar. Different sugar and their product. Crystallization of sugar. Factors affecting crystallization. Brief idea about different crystalline and non-crystalline candies. Caramelization. Role of sugar in cookery. Different natural and artificial sweeteners.	2		2	

Periodic Exam

Test Exam Part -II



Paper IV :(unit I+II) 100 marks	No. of Lectures	JUL-DEC.	JAN-MARCH	
Food commodities, Community nutrition practical	(7-8) Weeks	(12-14) Weeks	(8-10) Weeks	
Fats and Oils :- Classification & Nutritive value of fats and Oils. Different fatty acids. Structure of fat. Composition of fat. Chemical properties. Analysis of fats & oils. Degradation of fat, factors affecting it & its prevention. Smoking temperature of fat.	1		1	Periodic Exam
Food Preservation :- Objectives of preservation in brief. Different methods of preservation. Basic idea of food spoilage. Preparation of preserved products like jam, jelly, squash, pickles etc.	6		6	
Food Additives :- Brief idea about food additives.	1		1	
Leavening agent :- Brief idea about different leavening agent like baking powder, egg etc.	1		1	
Food adulteration & Food Standards :- Different food standards: BIS, Agmark, FPO, PFA, MPO etc. basic idea about food adulteration, quality. Factors responsible for food adulteration.	4		4	
Convenience Food :- Basic idea, types, role of convenience food.	1		1	
Spices :- Different spices, their composition, medicinal value & use. Basic idea about herbs.	2		2	
Beverage : classification, Tea, coffee, chocolate, cocoa, alcoholic and non alcoholic beverages processing and nutritional importance.	4		4	
Total	54	29	24	
Community nutrition practical (50)				
Anthropometric Measurement of infant- Length, Weight, Circumference, Chest, Med- upper arm circumference, precautions to be taken.	8	8		
Comparison with norms and interpretation of the nutritional assessment date and its significance.	3	3		
Weight for age, height for age, weight for height, Z scores body Mass Index (BMI), Waist-Hip Ratio (WHR).	6	6		
Growth charts-plotting of growth charts, growth monitoring and promotion.	6			
Clinical assessment and signs of nutrient deficiencies, Anaemia, Rickets, B-Complex deficiencies.	6			
Estimation of food and nutrient intake- Household food consumption date, per consumption unit, 24 hours dietary recall, 24 hours record.	4			
Weightment method, food diaries, food frequency data, use of each of the above, information available through each individual, collection of data, estimation of intakes.				
Community field survey.	6			
Total	39	17		

Paper V: (unit I+II)100 marks Biochemistry, Food Microbiology	No. of Lectures (7-8) Weeks	JUL-DEC. (10-12) Weeks	JAN-MARCH (6-8) Weeks
<p><u>ENZYMES & COENZYMES:</u></p> <p>ENZYMES : Definition & Classification, Kinetics (Gibbs free energy change, Reaction initiation energy), Michaelis-Menten equation, Reciprocal plot & its significance, Vmax & Km, substrate specificity, enzyme inhibition (irreversible- Penicillin inhibition, reversible explained from Reciprocal plot, allosteric-ribose reductase inhibition by nucleotides), isozymes-ex. LDH.</p> <p>COENZYMES : Definition, Biochemical Functions of: NAD, NADP, FAD, CoA, Tetrahydrofolate, TPP. Names of the Vitamins present in those coenzymes</p>	8 + 2 = 10		
<p><u>CARBOHYDRATES:</u> Glycolysis, Citric acid cycle, Electron transport chain (brief idea), glycogenesis, glycogenolysis, gluconeogenesis. HMP Shunt.</p>	8 + 2 = 10		
<p>LIPID : Beta-Oxidation, (alpha and omega oxidation-definition only), Synthesis & utilization of ketone bodies, Ketosis, Causes of fatty liver.</p>	6		
<p>PROTEIN : Tertiary & Quaternary structures of protein with Haemoglobin & Collagen as examples, Deamination & Transamination, amino acid metabolism.</p>		8 + 2 = 10	
<p>NUCLEIC ACID : Structure of Purines & Pyrimidines, Nucleosides & Nucleotides, Formation of Nucleic Acid Chain from Nucleotides, Importance of Thymine in DNA structure, Types of RNA & their functions (in brief), Structure of t-RNA, Codons, Definition of Central Dogma (Replication, Transcription, Translation - elementary idea only) & Machinery needed in each step (only names of the enzymes and coenzymes).</p>		6	
<p>VITAMINES : Structure & Biochemical roles, Deficiency disorders of Vitamin A, D, E, K, B1, B2, B6, Folic acid, Pantothenic acid, Niacin & Vitamin C.</p>		4	
<p>MINERALS : Biochemical functions of Na, K, Ca, P, I, Fe, Se - Disorders related to Hyperactivity & Deficiencies of those elements.</p>		4	
<p>CELLULAR TRANSPORT : Preliminary idea about membrane permeability, Active & Passive transport, Facilitated transport, a brief idea about gated-channels & membrane-bound transport protein.</p>		4	
<p>Microscope : - Different parts of microscope and its functions</p>	3		

Periodic Exam

Test Exam Part - III

Paper V: (unit I+II)100 marks Biochemistry, Food Microbiology	No. of Lectures (7-8) Weeks	JUL-DEC. (10-12) Weeks	JAN-MARCH (6-8) Weeks
Cultivation of Bacteria : - Nutritional requirements of microorganisms, types of growth media (selective, differential, enriched media-definition with example), Pure culture methods (streak plate, spread plate pour plate, slant culture), Anaerobic cultivation of bacteria.	4		
Growth of Bacteria : - Definition, growth phase, direct and indirect measurement of growth, Factors affecting growth (pH, temp and oxygen).	6		
Stains and staining techniques : - dye (Chromophore, auxochrome -definition with example). Classification of stains, principles of staining, simple staining, negative staining, differential staining (Gram staining and acid fast staining).	5		
Morphology of Bacteria :- slime layer, capsule, cell wall, flagella, pili, fimbriae, cell membrane, ribosome, cytoplasmic inclusions (inorganic), endospore (structure, formation and germination).		5	
Control of microbes :- Sterilization, Disinfection, Antiseptics, detergents, Methods of sterilization-Physical (heat, low temp, radiation, filtration). Chemical (alcohol, phenol, halogen, heavy metals, formaldehyde).		6	
Food Microbiology :- milk as a growth medium of bacteria, normal microflora in milk, undesirable microbes in milk, Pasteurisation, phosphatase test, Methylene blue reduction test. Normal microflora of vegetables & fruits, meat, fish, egg, canned food, cereal & cereal products, enumeration of microbes present in food & milk. Outline of methods for detection of microorganisms in drinking water (presumptive, confirmatory and completed test). distinction between faecal and non faecal coliforms-IMVic test. Extrinsic & intrinsic parameters affecting growth & survival of microbes.			8
Food borne diseases : - Food borne infection & intoxication. Different food borne diseases like Shigellosis, salmonellosis, Clostridium Perfringens food poisoning, Typhoid, E.Coli food poisoning, Bacillus cereus food poisoning-causative agent, symptoms, pathogenicity & preservation.			6
Total	44	39	14

Periodic Exam

Test Exam Part - III

Paper VI: (unit I+II)100 marks Diet Therapy I+II	No. of Lectures (7-8) Weeks	JUL-DEC. (10-12) Weeks	JAN-MARCH (6-8) Weeks
1. Basic concept of diet therapy : - different definitions related to diet therapy.	2		
2. Routine Hospital Diet :- Modification of normal diet into therapeutic diet. Purpose of diet therapy. Different modifications.	3		
Diet with Energy Modification : - Energy modification & nutritional care for weight management, identifying the overweight obese, aetiological factors contributing obesity, prevention & treatment of obesity. Low energy diet & balanced energy reduction. Underweight -aetiology, an assessment, high energy diets for weight gain.	5		
DIET FOR FEBRILE CONDITION :- <ul style="list-style-type: none"> ● Different causes of fever. ● Metabolic changes during fever (elementary idea). ● General dietary consideration. <u>Causes, clinical features, treatment& dietary management of-</u> <ul style="list-style-type: none"> ○ Short time fever(influenza) ○ Chronic fever (tuberculosis). ○ Intermittent fever (Malaria). 	4		
5. DIET DURING SURGERY :- <ul style="list-style-type: none"> ● General introduction ● Pre & post operative diet (brief idea). ● Dietary management. 6. DISEASES OF LIVER :- <ul style="list-style-type: none"> ● General introduction ● Symptoms of liver diseases. ● Reasons of liver diseases. ● Basic idea of liver function tests. <u>Causes, clinical features, treatment& dietary management of-</u> <ul style="list-style-type: none"> ○ Infective hepatitis & jaundice. ○ Cirrhosis of liver. ○ Hepatic coma. ○ Infantile biliary cirrhosis. 	4		
6. DISEASES OF Gall Stone- <ul style="list-style-type: none"> ● General introduction ● Type of Stones ● Dietary Management ● Basic idea of liver function tests. 	5 + 6 = 11		

Periodic Exam

Test Exam Part -III

	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	JAN-MARCH (10-12) Weeks
<p>Peptic Ulcer</p> <ul style="list-style-type: none"> ● General introduction of peptic ulcer diseases. ● Symptoms of peptic ulcer diseases. ● cause of peptic ulcer diseases. ● mechanism of ulcer formation <p><u>clinical features, treatment & dietary management</u></p> <p>9. <u>INTESTINAL DISORDERS</u>:- <u>General introduction and dietary management of different intestinal disorders-</u></p> <ul style="list-style-type: none"> ○ Constipation:-causes, complication, type (in brief), Dietary management. ○ Flatulence:-causes, treatment, dietary management. ○ Diarrhoea:-causes, physiological disturbance in the body during Diarrhoea. <p>Different types of Diarrhoea, Symptoms, Complication. Prevention & treatment.ORS.</p> <ul style="list-style-type: none"> ○ Steatorrhoea: - causes, treatment, dietary management. ○ Ulcerative colitis-causes, symptoms, treatment & dietary management. ○ Irritable bowel syndrome: - causes, symptoms, dietary management. 	5	8 + 4 = 12	
<p>Paper VII: (unit I+II)100 marks Diet Therapy II</p>	5		
<p>1. <u>CARDIO VASCULAR DISEASES</u>:-</p> <ul style="list-style-type: none"> ● General information & brief idea. ● Causes or factors of CHD in brief. ● Dietary management. <p><u>Causes, symptoms in brief & dietary management of the following :</u></p> <p>Atherosclerosis, hypertension, hypercholesterolemia, IHD, Congestive cardiac failure.</p>	8		
<p>2. <u>RENAL DISEASES</u>:-</p> <ul style="list-style-type: none"> ● General introduction. <p><u>Causes, symptoms in brief & dietary management of the following:</u></p> <ul style="list-style-type: none"> ○ Type I or Glomerulonephritis. ○ Type II or Nephrotic Syndrome. ○ Acute & chronic renal failure. ○ Renal calculi. 	8		

Periodic Exam

Test Exam Part -III

Paper VII: (unit I+II)100 marks Diet Therapy II	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	JAN-MARCH (10-12) Weeks	
3. DIABETES MELLITUS :- <ul style="list-style-type: none"> ● General introduction & classification. ● Factors responsible for diabetes. ● Role of hormones. ● Characteristics of type I & type II diabetes ● Treatment & dietary management of diabetes. ● Complications associated with it. 		8		
4. FOOD ALLERGY :- <ul style="list-style-type: none"> ● Introduction & definition related to food allergy. ● Predisposing factors of food allergy. ● Reasons for allergy. ● Classification of allergy. ● Allergic reaction (elementary idea). ● Symptoms of allergy. ● Role of food as allergen. ● Treatment & dietary management of food allergy; with elimination diet. 			8	
Total	55	20	8	
Paper VII: (unit I+II)100 marks Biochemistry Practical Food Preservation practical				
GROUP A :- QUALITATIVE ESTIMATION <ol style="list-style-type: none"> 1. Qualitative estimation of Carbohydrate (Mono, di and poly saccharides) Glucose, Fructose, Sucrose, Lactose, Starch, Dextrin. 2. Colour reactions of Protein. 3. Qualitative estimation of Fat. Solubility test, Unsaturation test, Saponification test, Test with soap & acrolin layer. 4. Chromatographic separation of Amino Acids from mixture of amino acids & determination of R_f value. 	12			
GROUP B :- QUANTITATIVE ESTIMATION <ol style="list-style-type: none"> 1. Standard curve of Protein by Biuret method using BSA. 2. Standard curve of Protein by Folin Phenol method using BSA. 3. Estimation of unknown Protein from egg or serum protein. 				

Periodic Exam

Test Exam Part -III



Paper VII: (unit I+II) 100 marks Biochemistry Practical, Food Preservation practical	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	JAN-MARCH (10-12) Weeks
4. Standard curve of PNP 5. Preparation of Buffer. 6. Quantitative estimation serum acid phosphatase. 7. Quantitative estimation serum alkaline phosphatase. 8. Quantitative estimation of vitamin C in lemon juice. 9. Quantitative estimation of glucose using fehling solution. 10. Determination of acid value of fat.			
<u>UNIT II:- FOOD PRESERVATION AND PREPARATION (50)</u> 1. Introduction to food preservation and different methods of food preservation. Purpose of food preservation. 2. Use of natural and chemical preservatives in preparation of different preserved products: Jam, Jelly, Squash, Pickles, Murabba etc. 3. Use of sun drying for preservation of food. 4. Preparation of fermented food product. 5. Visit:- Milk industry visit Food testing lab visit		20	
Paper VIII : Unit I :- Diet therapy Practical (35) 1. Introduction to therapeutic nutrition, its objectives. Different modification techniques (demonstration). 2. Planning and preparation of normal diet. 3. Planning and preparation of clear fluid and full fluid diet. 4. Planning and preparation of soft diet. 5. Planning and preparation of diets for the following condition <ul style="list-style-type: none"> o Jaundice. o Peptic Ulcer o Diabetes. o Fever. o CHD. 	20		

Periodic Exam

Test Exam Part - III

Paper VIII : Unit I :- Diet therapy Practical (35)	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	JAN-MARCH (10-12) Weeks	Test Exam Part -III
<ul style="list-style-type: none"> o Gout. o Renal Failure(acute or chronic). o Obesity. 				
Paper VIII Unit II : - Microbiology Practical (30)		14		
<ol style="list-style-type: none"> 1. Basic idea of process of sterilization. 2. Preparation of Nutrient agar media. 3. Inoculation of one gram positive and one gram negative bacteria 4. Gram Staining. 				
Paper VIII Unit III: - Project and seminar(35)			10	
<ol style="list-style-type: none"> 1. Review and project work. 2. Seminar presentation. 				
Total	32	34	10	

Department of Chemistry
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Part-I (1st Year) : Paper-I

Heading of the Chapter	No. of Lectures	Marks	JUL-DEC No. of Lectures	JAN-UNE No. of Lectures			
CEMGT 11A							
UNIT-1 : Basic Physical Chemistry I							
1. a. Gaseous State	(10-15)	12	10		8		
1. b. Liquid State	(4-5)						
1. c. Crystalline state	(3-5)						
UNIT-II : Basic Physical Chemistry II							
2. a. Defination of thermo-dynamic Terms	(3-4)	13	4		7		
2. b. First law of thermodynamics	(8-10)						
2. c. Accplication of First Law	(8-10)						
CEMGT 11B							
UNIT-I : General Chemistry				Mid term Examination		Test Examination	Study leave and Counselling
1. a. Extra-nuclear structure of atoms	(10-15)	12	14		7		
1. b. Radioactivity & Nuclear structure of atoms	(8-10)						
UNIT-II : Organic & Inorganic Qualitative analysis							
2. a. Principles of organic qualitative analysis	(8-15)	13	12		8		
2. b. Principal of Inorganic qualitative analysis	(10-15)						
CEMGT 11C							
UNIT-I : Basic Inorganic Chemistry I							
1. a. Inductive & Resonance effect	(2-4)	12	10		8		
1. b. Alkanes, alkenes & alkynes	(8-10)						
1. c. Aromatic hydrocarbons	(6-8)						
UNIT-II : Basic Organic Chemistry II							
2. a. Stereo Chemistry of Carbon compounds	(6-10)	13	12		7		
2. b. Alkyl and Aryl Halide	(2-4)						



Heading of the Chapter	No. of Lectures	Marks	JUL-DEC No. of Lectures	JAN-UNE No. of Lectures			
				Midterm Examination	Test Examination	Study leave and Counselling	Part I Examination
2. c. Alcohol and Ether	(2-4)						
2. d. Organometallic Compounds	(4-8)						
CEMGT 11D							
UNIT-I : Basic Inorganic Chemistry							
1. a. Ionic bonding	(6-8)	12	12		7		
1. b. Covalent bonding	(10-12)						
UNIT-II : Basic Organic Chemistry II							
2. a. Chemical periodicity	(10-15)	13	15		6		
2. b. Comparative Study of P block elements	(8-10)						

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TEACHING PLAN

SESSION 2016-2017
(1+1+1 System) Degree Course (General) B.Sc

Part-II (2nd Year) : Paper-II

Heading of the Chapter	No. of Lectures	Marks	JUL-DEC No. of Lectures	JAN-UNE No. of Lectures				
CEMGT 22A								
UNIT-1 : Basic Physical Chemistry III								
1. a. Spontaneous process, heat engine	(6-8)	12	10		6			
1. B. Chemical equilibrium	(4-6)							
UNIT-II : Basic Physical Chemistry IV								
2. a. Chemical kinetics and catalysis	(8-10)	13	12					
2. b. Photochemistry	(6-8)							
CEMGT 22B								
UNIT-I : Basic Physical Chemistry				Mid term Examination				
1. a. Acid-bases and solvents	(8-10)	12	12			8		
1. b. Solutions of electrolyte	(6-8)							
1. c. Electrode potential	(3-6)							
UNIT-II : Basic Physical Chemistry VI								
2. a. Solutions of non-electrolytes	(8-12)	13	12		6			
2. b. colloids	(6-8)							
CEMGT 22C								
UNIT-I : Basic Organic Chemistry III								
1. a. Aldehyde and Ketones	(8-10)	12	12		8			
1. b. Carboxylic acid & their derivatives	(3-5)							
1. c. Carbohydrates	(6-8)							
UNIT-II : Basic Organic Chemistry IV								
2. a. Phenole	(2-4)	13	10		8			
2. b. Organic Compound Containing nitrogen	(8-10)							
2. c. Amino Acids, protein	(4-6)							



Heading of the Chapter	No. of Lectures	Marks	JUL-DEC No. of Lectures	JAN-UNE No. of Lectures			
				Midterm Examination		Test Examination	Study leave and Counselling
CEMGT 22D							
UNIT-I : Basic Inorganic Chemistry							
1. a. Co-ordinate bonds and co-ordination compound	(8-12)	12	12		6		
1. b. Preparation and uses of some important compounds	(6-8)						
UNIT-II : Basic Inorganic Chemistry IV							
2. a. Comparative study of s-block elements	(8-12)	13	10		8		
2. b. Extraction and purification of elements	(6-8)						



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Part-III (3rd Year) : Paper-IV

Heading of the Chapter	No. of Lectures	Marks	JUL-DEC No. of Lectures	JAN-UNE No. of Lectures				
CEMGT 34A								
UNIT-1 : Chemical analysis	(6-8)		10	6				
1. a. Gravimetric Analysis		12						
1. B. Error analysis and computer application	(8-10)							
UNIT-II : Volumetric Analysis								
2. a. Principles of acid-base, oxidation reduction & complexometric titration	(10-12)	13	10	4				
2. b. Chromatographic method of analysis	(2-4)							
CEMGT 34B								
UNIT-I : Industrial Chemistry-I								
1. a. Fuels	(6-8)	12	10					
1. b. Fertilizers	(2-4)							
1. c. Glass and ceramics	(3-5)			4				
UNIT-II : Industrial Chemistry II								
2. a. Polymers	(4-6)							
2. b. Paints, Varnishes and Synthetic Dyes	(4-6)	13	9	6				
3. c. Drug and pharmaceuticals	(3-5)							
CEMGT 34C								
UNIT-I : Environmental Chemistry								
1. a. The atmosphere	(6-8)	12	10	6				
1. b. The hydrosphere	(6-8)							
1. c. Lithosphere	(2-4)							
UNIT-II : Industrial Chemistry III								
2. a. Fats, Oils, Detergents	(6-8)	13	8	5				
2. b. Pesticides	(2-4)							
2. c. Food Additives	(3-5)							

Mid term Examination

Test Examination

Study leave and Counselling

Part II Examination

Department of Botany
TEACHING PLAN

PART-I

SESSION 2017-2018

1+1+1 Degree Course (General)

Paper Units	Headline of the Subject	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-FEB	MAR-APR	
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (5-6) No. of Lectures	Periodical Examination	Periodical Examination
Algae	<i>Group A</i>	10	10	5	3	1	1	1
	General characters, Features of different classes, Cyanobacteria, Alternation of generation Economic importance							
Fungi and Lichen	General Character & spore type, Features of different groups, Anamorph & Telomorph, Mycorrhiza, Lichen, Economic importance	10	10	3	3	2	2	2
Pathology	Terms & Definition, Disease, Disease triangle & Management, Koch's Postulate, Phytoalexin, Disease cycle and control Measures, Tungrovirus disease of rice, Late Blight of Potato	10	7	3	2	1	1	1
Micro-biology	General character of Microbs, Gene Transfer, Economic Importance of Microbs, domains of life, prokaryote & Eukaryote, Bacterial growth, Bacterial gene transfer methods, Virus, Economic Importance	10	8	5	2	1	1	1
TOTAL		40	35	16	10	5	4	4

Department of Botany

Paper Units	Headline of the Subject	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR	MAY-APR								
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures	Part I Examination								
Bryophyta	<i>Group B</i>	8	4	1	2	1									
	General Characters, Representative of different groups,														
	Pteridophyta								General characters, different with other groups. Representative of different groups.	8	4	2	1	1	
	Gymnosperms								General characteristics, Evolution, Representative of different groups.	8	4	3	1	—	
Paleobotany	Fossilization process	6	3	2	1										
TOTAL		30	15	8	5	2									
<i>Group C</i>															
Morphology of angiosperm	Types of inflorescences, Flower and Modification	5	3	2	1	—	—								
Palynology	Definition, Pollen Type, Branches and Application	5	2	2	—	—	—								
Taxonomy of angiosperms	Objective, Branches, Alpha and Omega, Different types of classification, ICBN, Bentham and Hookers, Classification, Different families	20	10	2	5	2	1								
TOTAL			15	6	6	2	1								

Department of Botany
TEACHING PLAN

PART-II

SESSION 2016-2017

1+1+1 Degree Course (General)

Paper Units	Headline of the Subject	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	OCT-DEC Weeks (6-8) No. of Lectures	JAN-FEB Weeks (5-6) No. of Lectures	MAR-JUNE
II	1. Group A						
	Anatomy: Cell wall, Stomata, Evolution of stelar type, Shoot apex, & root apex, Secondary growth	10	8		4	4	
	Embryology : Sporogenesis & gametogenesis, Embryo development in <i>Capsella bursa-pastoris</i> . Endosperm development.	10	8	5		2	1
	Economic Botany	10	5		2	3	1
	Ecology : Ecotype & microclimate, Plant community, Ecological adaptation, Biodiversity, Conservation	10	6		3	3	6
	2. Group B						
	Cell Biology : Endomembrane structure & cytoskeleton, nuclear membrane & nucleolus, nucleosome, euchromatin, heterochromatin. Cell-cycle, Chromosomal Abnormalities. Genetics : Central dogma, DNA replication, Structure, translation and transcription, Genetic code, mendelian basis of inheritance, Linkage, Sex determination, testcross and back cross, genetic map, three point test cross,	30	25		15	5	5



Department of Botany

Paper Units	Headline of the Subject	Marks	No. of Lectures	JUL-SEPT	OCT-DEC	JAN-APR	MAY-JUNE			
				Weeks (9-10) No. of Lectures	Weeks (6-8) No. of Lectures	Weeks (10-12) No. of Lectures				
	Biochemistry: Biomolecules : structure and application, Enzymes. Plant Physiology : Transpiration, k ⁺ Ion effect and transport, Photosynthesis, Respiration, Photorespiration, Nitrogen fixation, genetic basis of nitrogen fixation, Plant hormone, photomorphogenesis.									
				Class Test		Periodical Examination		Periodical Examination		Part I Examination
	3. Group C	30	25	15	8	2	18			
	TOTAL	100	75	44	22	22	14			

INSTITUTIONAL CALENDAR

Commencement of Academic Session	:	1st July of each year.
Admission to 1st year Honours & General	:	Within 3-4 days after announcement of HS result of WBCHSE.Course (UG level)
Enrolment in 2nd year Degree Course	:	Within 7 days after completion of (1+1+1) Part I Exam./July 2nd week Course (UG level)
Enrolment in 3rd year Degree Course	:	1st & 2nd Week of July. Within 7 days after completion of (1+1+1) Part II Exam.)
Admission to 1st year PG level	:	Within 7 days of announcement of B.A./B.Sc. Part-III Exam result of C.U. (1+1+1 System)
Death anniversary of Rastraguru : Surendranath Banerjee	:	6th August. (Holiday)
Commencement of 1st year Class (UG level)	:	2nd - 3rd Week of July.
Blood Donation Camp	:	2nd Week of August
Health Awareness Seminar	:	Last eek of August –First Week of September
Class Test	:	2nd Week of September
College Foundation day :	:	9th September. (Holiday)
Result	:	3rd Week of September
Puja Vacation (28 days) :	:	During Sep.-Oct.-Nov. as per respective year calendar
1st Deptmental Seminar :	:	Last week of October / Before Puja Holiday
Birth Day of Rastraguru Surendranath Banerjee.	:	10th Nov. (Holiday)
Rastraguru Surendranath Banerjee Memorial Lecture	:	November
Cultural Meet & Career Fair	:	December
Alumni Meeting	:	1st Sunday of December.
Winter Recess :	:	Last Week of December
Mid-Term Examination	:	1st–2nd Week of January
PG I & III Sem. Examination	:	1st–2nd Week of January
Result Publication of Mid Term Exam	:	3rd Week of January
2nd Departmental Seminar	:	1st–2nd Week of February
B. A., B.Sc., B.Com. Part-I, Part-II & Part-III (1+1+1 System)	:	As per University Guideline
Form Fill up for B.A./B.Sc./B.Com. (Part-III) (1+1+1 System)	:	As per University Guideline
Form Fill up for B.A./B.Sc./B.Com. (Part-II) (1+1+1 System)	:	As per University Guideline
Form Fill up for B.A./B.Sc./B.Com. (Part-I) (1+1+1 System)	:	As per University Guideline
B.A., B.Sc. & B.Com. Part III Examination (1+1+1 System):	:	As per University Guideline
B.A., B.Sc. & B.Com. Part II Examination (1+1+1 System) :	:	As per University Guideline
B.A., B.Sc. & B.Com. Part I Examination (1+1+1 System) :	:	As per University Guideline
PG II & IV Sem. Examination	:	4th Week of May–1st Week of June
Publication of PG Result :	:	Last week of June
Summer Recess	:	16th May to 30th June

Rest of the Holidays are according to the guideline of affiliated University and Government of West Bengal.