TEACHING PLAN

Advancement of Learning ◆ Need Based Higher Education ◆ Excellence through Academics

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

BARRACKPORE

RASTRAGURU SURENDRANATH COLLEGE

Affiliated to the West Bengal State University & Registered under 2f & 12B of UGC Act.

Re-accredited by NAAC

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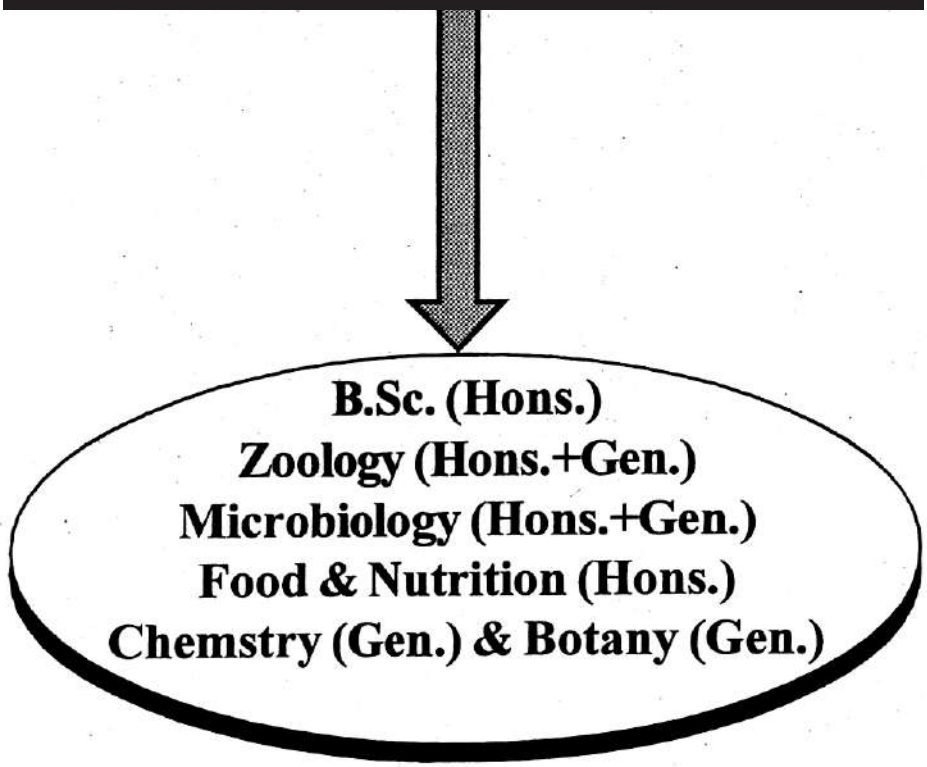
ESTD. 1953

Teaching Plan



Department of Zoology (Honours)

TEACHING PLAN

PART I

SESSION 2017-2018

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	
					Class Test		Periodical Examination		Periodical Examination	Study leave and Counselling	Part I Examination
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	Full Marks	3	3							
	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 Paramoecium.		6	6							
ZH102	**Non-Chordates**	35	56								
	1. <u>pecies diversity and classifications of non-chordate phyla</u>										
	Poriferans,		2	2							
	Cnidarians,		2	2							
	Ctenophorans,		2	2							
	Platyhelminths,		2	2							
	Aschelminthes,		2	2							
	Annelids,		4	4							
	Molluscs,		4	4							
	Echinoderms,		4					4			
	Arthropods (upto subclass),		4					4			
	Rotifera,		1					1			
	Bryozoa,		1					1			
	Hemichordata (only salient features of the Phyla)		1					1			

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

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Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	Class Test	OCT-DEC Weeks (6-8) No. of Lectures	Periodical Examination	JAN-APR Weeks (10-12) No. of Lectures	Periodical Examination	MAY-JUNE Study leave and Counselling	Part I Examination
	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			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**	**20**	**26**								
	1. Tinbergen's four questions on studying animal behaviour ;		2	2							
	2. Definitions and examples of- habituation, instinctive behaviour, FAP, imprinting and other programmed learning, cultural transmission		12	8		4					
	3. Social animals- advantages and disadvantages of living in a group, examples of social animals and outline of their social structures		6			4		2			

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Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	Class Test	OCT-DEC Weeks (6-8) No. of Lectures	Periodical Examination	JAN-APR Weeks (10-12) No. of Lectures	Periodical Examination	MAY-JUNE Study leave and Counselling	Part I Examination
	4. Definition and examples of altruism, eusociality, units of selection (just preliminary ideas)		6					6			
	Total		**100**	**136**		**63**		**46**		**27**	
II	**Evolution and Preliminaryknowledge for quantification in biology**	50									
ZH 201	**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 Biston betularia as example		4					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) Punctuationist 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**			

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Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	Class Test	OCT-DEC Weeks (6-8) No. of Lectures	Periodical Examination	JAN-APR Weeks (10-12) No. of Lectures	Periodical Examination	MAY-JUNE Study leave and Counselling	Part I Examination
ZH202	**Preliminary knowledge for quantification in biology**	15	26								
	i) Logarithm		2	2							
	ii) Matrices		2	2							
	iii) Permutation and Combination		3	3							
	iv) Probabilities		3	3							
	v) Graphical representation of data		2	2							
	vi) Discrete and continuous variables		1			1					
	vii) Mean, Mode and Median		2			2					
	viii) Standard deviation, Variance and Standard error	Full Marks	3			3					
	ix) Simple Correlations,		3			3					
	x) Concept of hypothesis testing, Tests for goodness of fit- Chi-square, Student t-test		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			

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PART II

SESSION 2017-2018

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) No. of Lectures		OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures			MAY-JUNE	
										Study leave and Counselling	Part I Examination
401	**Genetics**	20	27								
	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	Full Marks	2	2	Class Test		Periodical Examination		Periodical Examination		
	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										
	ix)Types of mutations		5					5			

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Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	Class Test	OCT-DEC Weeks (6-8) No. of Lectures	Periodical Examination	JAN-APR Weeks (10-12) No. of Lectures	Periodical Examination	MAY-JUNE Study leave and Counselling	Part I Examination
	x) Transposable genetic elements		3					3			
	xi) Genetic engineering		9					9			
	Total		**40**	**20**				**20**			
403	**Biochemistry**	**30**	**40**								
	i) Chemical evolution of biomolecules		2			2					
	ii) significance of water		2			2					
	iii) Structural identities of biomolecules : Carbo-hydrates, Amino Acids, Peptides, Lipids, nucleic acids		15			4		11			
	iv) Enzymes (major classes of enzymes-mode of actions and examples) and enzyme kinetics		6					6			
	v) Metabolic pathways : Glycolysis, HMP shunt, Kreb's cycle, electron transfer system, Gluco-neogenesis, Glycolysis, beta oxidation	Full Marks	15					15			
	Total		**40**			**8**		**32**			
404	**Biophysics**	**20**	**20**								
	i) Three-dimensional structure of proteins		3					3			
	ii) Structure of nucleic acids		3			3					
	iii) Chromosome structure including Nucleosomes		3			3					
	iv) Introductory principles of common methods used in biochemistry and biophysics : Chromatography, Ultra-centrifuge, Electrophore-sis, X-ray crystallography Immunoeletrophoresis & Western blotting		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) No. of Lectures		OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures			MAY-JUNE	
		Full Marks			Class Test		Periodical Examination		Periodical Examination	Study leave and Counselling	Part I Examination
501	**Taxonomy and Systematics**	10	15								
	i) Modern definitions of taxonomy and systematics, philosophy and working of modern taxonomy, Linaean hierarchy,		4	4							
	ii) Concept of a species in taxonomic practice		3	3							
	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										
	vi)Wildlife Conservation: Major forest types and their locations in India		3				3.				

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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	
	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**				Periodical Examination		Study leave and Counselling	Part I Examination
	i) The study of microbial structure		2	2						
	ii) Microbial Nutrition		2	2						
	iii) Microbial growth		2	2						
	iv) Control of Microorganisms by Physical and Chemical agents	Full Marks	3	3	Class Test			Periodical Examination		
	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**		

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Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	Class Test	OCT-DEC Weeks (6-8) No. of Lectures	Periodical Examination	JAN-APR Weeks (10-12) No. of Lectures	Periodical Examination	MAY-JUNE Study leave and Counselling	Part I Examination
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	Full Marks	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					
			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					

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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 occular micrometer 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			
		Full Marks	72	27	Class Test	21	Periodical Examination	24	Periodical Examination	Study leave and Counselling	Part I Examination
	Total	**100**		**54**		**39**		**51**			

Department of Zoology (Hons.)

PART III

SESSION 2017-2018

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**	40	50								
	i) Transport across cell surface membrane, Donnan membrane equilibrium		6	6							
	ii) Functions of mammalian blood : Oxygen transport and CO2 transport		6	6							
	iii) Neurophysiology : Generation of action potential and propagation of nerve impulse in myelinated and non-myelinated nerve fibers. Synaptic and neuromascular junctions : structure and functions		6	6							
	iv) Respiration : gill respirations in fishes, respiration in air-breathing fishes, respiration in avian lungs	Full Marks	6	6	Class Test		Periodical Examination		Periodical Examination	Study leave and Counselling	Part I Examination
	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		6			6					
	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		4			4					

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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									
	viii) Urine formation in human kidney		6				6			
	ix) Bioluminescence : occurrence, mechanism of production		4				4			
	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).		2	2						
	ii) Hormone delivery systems : Endocrine, neuroendocrine, paracrine, neurocrine, autocrine (Definitions and examples only)	Full Marks	2	2	Class Test		Periodical Examination	Periodical Examination	Study leave and Counselling	Part I Examination
	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				

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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**	**20**	**30**								
	i) Basic tissue types : epithelial, connective, cardiac and nervous tissue(typical structure of neuron and types of neuron, glial cells etc)		6			6					
	ii) Membrane specializations of epithelia. (Intercellular surface [cell junctions], luminal surfaces and basal surfaces.).		3			3					
	iii) Exocrine glands : Types and discharge of secretory products (merocrine, apocrine, holocrine).		3			3					
	iv) Principles of tissue fixation, staining		3					3			
	v) Histology of: stomach, pancreas, testis, ovary, thyroid, lymph node. (Outline of structures).		12					12			
	vi) Histological structure of mammalian nephron and functions of each regions.		3					3			
	Total		**130**	**54**		**48**		**28**			

Full Marks | Class Test | Periodical Examination | Periodical Examination | Study leave and Counselling | Part I Examination

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 Weeks (9-10) No. of Lectures	OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures	MAY-JUNE
801	**Developmental Biology**	30	42	Class Test	Periodical Examination	Periodical Examination	Study leave and Counselling / Part I Examination
	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.	Full Marks	3	3			
	ii) Germ layers and its contributions to the development of different tissues in vertebrates.		3	3			
	iii) Origin of germ cells, Structural features of sperms and eggs in sea urchins and in mammals, Gametogenesis in mammals,		6	6			
	iv) Fertilization : external fertilization in sea urchins, internal fertilization in mammals (in depth molecular details not required)		6	6			
	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		3	3			
	vi) Gastrulation : generalized patterns, brief outlines of the process in C. elegans, Zebra fish, Xenopus and chick		9	9			
	vii) Organogenesis : development of brain in chicken		3		3		
	viii) Conceptual outlines (very brief) of - Cell potency and Stem Cells,		9		9		

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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	
	Sex determination in Drosophila and Man, Environmental sex determination in reptiles. HOX genes in development										
	Total		**42**	**30**		**12**					
802	**Environmental Pollutions and Toxicology**	**20**	**26**								
	i) Environmental pollutions (nature and sources of pollutants, impacts on ecosystems and humans, remedies): water, soil, air and sound pollutions		12	12							
	ii) Environmental laws : major ones applicable in West Bengal		3	3							
	iii) Toxicology: including its significance as a branch of Science	Full Marks	2	2	Class Test		Periodical Examination		Periodical Examination	Study leave and Counselling	Part I Examination
	iv) Dose-response relationships		3			3					
	v) In vivo and In vitro toxicity tests		3			3					
	vi) Introduction to the concepts of detoxication mechanisms		3			3					
	Total		**26**	**17**		**9**					
805	**Medical Zoology**	**15**	**20**								
	i) Mosquito-borne diseases: Malaria and Filaria-causative 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		6	6							
	ii) Mosquito-borne diseases: Dengue and DHF, Chikungunya-causative virus, symptoms and treatments		6			6					

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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	
	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**	**35**	**45**								
	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)	Full Marks	21		Class Test	6	Periodical Examination	15	Periodical Examination	Study leave and Counselling	Part I Examination
	ii) Sericulture : silks and silk worms, sericulture practices- methods, scopes and problems		6			6					
	iii) Apiculture : Honey bees and their behaviours in relation to bee-keeping popular methods of bee keeping, scopes and problems		6			6					
	iv) Lac culture : Lac and lac insects, host plants and lac cultivation, scopes and problems		6			6					

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	
	v) Poultry birds: different breeds, their advantages and disadvantages, importance of indigenous breeds vi) Cattle, goats and lambs: different breeds, their advantages and dis-advantages, importance of indigenous breeds	Full Marks	3 3 45		Class Test	24	Periodical Examination	3 3 21	Periodical Examination	Study leave and Counselling	Part I Examination
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) No. of Lectures		OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures			MAY-JUNE	
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, Nemathelminthes, Annelida, Arthropoda, Mollusca and Echinodermata (upto Sub class). 2. General structure and function of the following with reference to the specimens mentioned :	**30** Full Marks	**30** 5	5	Class Test		Periodical Examination		Periodical Examination	Study leave and Counselling	Part I Examination

Department of Zoology (General)

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) Locomotion : a) Microfibrils (Amoeba), b) Cilia (Paramoecium), c) Parapodia (Neanthes).	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 (Taenia), 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 (Paramoecium), c) Sexual (Earthworm), d) Metagenesis (Obelia), e) Metamorphosis in insects		4			4					
	Total			**16**		**14**					

Department of Zoology (General)

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	
	Group B : Chordates	**30**	**30**								
	1. Classification of Phylum Chordata with distinctive features and suitable examples – Fishes and Aves (upto Sub class); Amphibia, Reptilia and Mammalia (upto living orders).	Full Marks	5	5	Class Test		Periodical Examination		Periodical Examination	Study leave and Counselling	Part I Examination
	2. a) Functional anatomy in relation to filter feeding (Branchiostoma); circulation with special reference to portal system.		3	3							
	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).		4	4							
	ii) Digestive system — pharynx (Ascidia); stomach (Columba and Bos).		4	4							
	iii) Respiratory system — gills (fish); accessory respiratory organs (fish); lungs (birds and mammals).		4			4					
	iv) Excretory system–pro-, meso- and meta-nephric kidneys in vertebrates.		3			3					
	v) Circulatory system – single circuit heart (fish); double circuit heart (amphibia and mammals); modification of aortic arches in vertebrates.		4			4					
	vi) Nervous system — Brain of Bufo; origin and distribution of cranial nerves in vertebrates.		3			3					
	Total		**30**	**16**		**14**					

Department of Zoology (General)

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	
	Group C : Parasitology and Endocrinology 1. a) Parasitism (definition and different types) b) an outline idea of other interspecific interactions (symbiosis, commensalism and mutualism). 2. Life history, pathogenecity and clinical featuresof i) Entamoeba histolytica, ii) Plasmodium vivax, iii) Ascaris. 3. General characters of hormones. 4. Mammalian endocrine glands (pituitary, thyroid and pancreas with their hormonal functions).	20 Full Marks	15 2 6 3 6		Class Test		Periodical Examination	2 6 3 6	Periodical Examination	Study leave and Counselling	Part I Examination
	Total		**15**					**15**			
	Group D : Ecology, Ecosystem and Environment 1. Definition, components, energy flow, food chain, food web, ecological pyramids. 2. Population – definition and growth. 3. Community – definition and types. 4. Pollution – air, water and noise. 5. Global warming and its impact on environment. 6. Concept of EIA.	20	15 5 2 2 2 2					5 2 2 2 2			
	Total	**100**	**90**	**32**		**28**		**30**			

Department of Zoology (General)

PART II

SESSION 2017-2018

Paper II Theory (100)

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

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

Department of Zoology (General)

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	
	6. Mechanism of replication, transcription and translation in E. coli	Full Marks	6		Class Test	6		Periodical Examination	Periodical Examination	Study leave and Counselling	Part I Examination
	7. Modes of inheritance of autosomal and sex-linked genes in man; Thalassemia and Haemophilia.		3			3					
	8. Linkage and recombination.		3			3					
	9. Point mutation and changes in chromosome number with reference to chromosomal aberrations. Down syndrome and Klienfelter syndrome.		3			3					
	10. Sex determination in Drosophila and man.		4				4				
	Total		**30**	**11**		**15**	**4**				
	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	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	
	concentration, pH and temperature).									
	3. Classification of carbohydrate, protein and lipid; Concept of glycolysis and Kreb's cycle.		6				6			
	4. Neoglucogenesis.		1				1			
	5. A brief idea on muscle contraction.		2				2			
	6. Physiology of nerve impulse and synaptic transmission and neuromuscular junction.		3				3			
	Total	**100**	**100**	**26**		**30**	**44**			
III	**(Practical, 100 marks)**									
Dissection	**1. Dissection**		**24**							
	Cockroach-Digestive, nervous and female reproductive system		12	12						
	Tilapia (Oreochromis sp) – urinogenital system and brain,		12			12				
Mounting and preparation	**2. Mounting and preparation:**		**21**							
	a) Mouth parts of cockroach.		3	3						
	b) Setae of earthworm.		3	3						
	c) Cycloid, ctenoid and placoid scales.		3	3						
	d) Blood film of rat and haemolymph of cockroach (Leishman/Giemsa stain).		3	3						
	e) Gut content of cockroach for parasites.		3			3				
	f) Whole mount of aquatic micro-arthropods.		3			3				
	g) Epithelial cells from buccal smears.		3			3				
Identification	**3. Identification with reasons :**		**42**							
	a) **Bones :** Skull, vertebrae, limb and girdle bones of Columba and Cavia.		12	12						

Full Marks | Class Test | Periodical Examination | Periodical Examination | Study leave and Counselling | Part I Examination

Department of Zoology (General)

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	Class Test	OCT-DEC Weeks (6-8) No. of Lectures	Periodical Examination	JAN-APR Weeks (10-12) No. of Lectures	Periodical Examination	MAY-JUNE Study leave and Counselling	Part I Examination
	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, Paramoecium, Scypha, Obelia, Sea-anemone, Ascaris, Leech, Centiped, Miliped, Scorpion, Lamellidens, Achatina, Loligo, Starfish, Balanoglossus.		12					12			
	d) **Chordate specimens :** Ascidia, Branchiostoma, Petromyzon, Scoliodon, Anabas, tree frog, Axolotl larva, Tylototriton, Gecko, Hemidactylus, Mabuia, Turtle, Naja, Chiroptera.		12					12			
Field Study	**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**			

Department of Zoology (General)

PART III

SESSION 2017-2018

Paper Units	Course Content	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	Class Test	OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures	Periodical Examination	Periodical Examination	MAY-JUNE	Part I Examination
IV	**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.	Full Marks	10	10						Study leave and Counselling	
	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.		6	6							
	Apiculture – Types of honey bees, modern methods of apiary management, products and its uses. Problems and prospects.		6			6					
	Pest and Pest Management – Pest - definition, types, life history and control i) Scirpophaga, ii) Sitophilus and iii) Bandicoota, Concept on IPM.		6			6					
	Poultry and Poultry Management–Duck and fowl - Types of breeds, rearing and disease management.		2			2					

Department of Zoology (General)

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	
					Class Test		Periodical Examination		Periodical Examination	Study leave and Counselling	Part I Examination
	Wild life and Biodiversity -	Full Marks	14								
	1. Conservation of Wild life - Importance and strategies, Concept of Biosphere Reserve, National Park and Wild life Sanctuary.		6			6					
	2. Basic concept of Biodiversity, Biodiversity hotspot.		4					4			
	3. Endangered Indian mammals, Animal Cruelty Prevention Act.		4					4			
	Biotechnology and Immunology -		12								
	1. Basic concept of genetic engineering and cloning;		6					6			
	2. Concept of immunity;		4					4			
	3. Outline structure and classification of immunoglobulin; antigen-antibody reaction;										
	4. Basic principle of vaccination.		2					2			
	Total		**56**	**16**		**20**		**20**			
IVB Experimental works	**(Practical, 40 marks)**										
	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 Weeks (9-10) No. of Lectures		OCT-DEC Weeks (6-8) No. of Lectures	JAN-APR Weeks (10-12) No. of Lectures			MAY-JUNE	
	ix) Tests for food colors/ adulteration : mustard oil red chili powder, turmeric powder, toxic colors in vegetables/ sweets.	Full Marks	6		Class Test	6		9	Periodical Examination	Study leave and Counselling	Part I Examination
	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								
	3. Identification : (write specimen characters, scientific name and applied importance) *Plasmodium, microfilaria of Wuchereria bancrofti, Taenia solium, Scirpophaga insertulas, Sitophilus oryzae, Leucinodes orbonalis, Anomis sabulifera, Bombyx mori, Lepisma, Termite, Bandicoota bengalensis, Labeo rohita, L. bata, Catla catla, Cirrhinus mrigala, Hypopthalmichthyes molitrix, Cyprinus carpio, Ctenopharyngodon idella, Lates calcarifer, Temialosa ilisha, Penaeus monodon, Macrobrachium rosenbergi.*		15			6	9				
	Total		**54**	**15**		**21**	**18**				

Department of Microbiology (UG)
TEACHING PLAN

SESSION 2017-2018
(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) No. of Lectures	JAN-APRIL (10-12 weeks) No. of Lectures		
					Periodic Examination		Test Examination Part-I
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	**50**	06	84-96		60-72	
	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)						

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	Periodic Examination	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)						
	Group : B	**50**	06	84-96	Periodic Examination	60-72	Test Exam. Part-II
	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**					
	Group : A	**50**	04	56-64		40-48	
	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	Periodic Examination	60-72	Test Examination Part-II
	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 nephalometic method (*E. coli*). (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			Periodic Examination		Test Examination Part-III
	Group : A	**50**	05	70-80		–	
	Genetics and Biometry (50)[a]						
	Principles of elementary genetics (15) (i) Mendelian geneties (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**		–	

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			Periodic Examination	–	Test Examination Part-III
	Group : A	50	04	56-64			
	Virology and Medical Microbiology (60)[a]						
	Virology (25) Medical Microbiology (20) Commone 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			Periodic Examination	–	Test Examination Part-III
	Practical (48-60)		06	84-96			
	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	06	84-96	Periodic Examination	–	Test Examination Part-III
	Practical (48-60)						
	1. Antigen–Antibody reaction : (a) Agglutinaton (blood typing) (b) Ouchterlony's agar diffusion method. (c) Single radial immunodiffusion (Mancini's method). (d) Immunoelectrophoresis 2. Isolation of plasmid DNA from *E. coli* by using a standard method : Gel-electrophoresis (Agarose-gel), quantification and estimation of purity of DNA. 3. Transformation of *E. coli* 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 2017-2018

(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				Periodic Examination	Test Examination Part-I
	Group : A	**50**	03	42-48	30-36		
	General Microbiology (61)[a]						
	1. Basic Microbiology : Landmark of Microbiology in 20th century (04) Major contribution of scientists (04) Scope of Microbiology (02) Whittaker's five kingdom concept.... (06) Eubacterial classification up to family (06) Cell structure & sub cellular organelles (12) 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					
	Group : A	**50**	06	84-96	Periodic Examination	60-72	Test Examination Part-I
	General Microbiology (85)[a]						
	1. Microscopy-Description & Operation of Copound 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					
	Group : A	**70**	03	42-48		30-36	
	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)				Periodic Examination		Test Examination Part-II
	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	Periodic Examination	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
	Attendence in the practical classes	Performance in the practical classes	Laboratory Note Book		
Marks	40	30	10	20	100

Department of FNTA

TEACHING PLAN

SESSION 2017-2018

(1+1+1 SYSTEM) Degree Course (Honours)

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 it 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	Periodic Exam		Test Exam Part -I
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. Galactogogue.	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	

Paper I: (unit I+II) 100 marks Human Nutrition & Food Science	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	Periodic Exam	JAN-APR (10-12) Weeks	Test Exam Part -I
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)					
Carbohydrate :- classifiation, structure, properties, digestion, absorption, function, deficiency and excess	10	10			
Protein : classifiation, structure, properties, digestion, absorption, function, deficiency and excess	10	10			
Lipids :- classifiation, structure, properties, digestion, absorption, function, deficiency and excess	10	10			
Dietary fibre :- classifiation,properties,function, deficiency and excess	2	2			
Vitamins:- classifiation,structure,absorption, function, deficiency and excess	10			10	
Minerals:- :- classifiation,absorption,function, deficiency and excess	8			8	
Water:- 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			

Paper II: (unit I+II) 100 marks Human physiology & Physiology practical	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	Periodic Exam	JAN-APR (10-12) Weeks	Test Exam Part -I
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-intestinalsystem : Anatomical structure and function of G I 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 O2 and CO2 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**	

Paper III: (unit I+II) 100 marks Community nutrition, Public health epidemiology	No. of Lectures (7-8) Weeks	JUL-DEC. (12-14) Weeks	Periodic Exam	JAN-MARCH (8-10) Weeks	Test Exam Part -II
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**	

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	
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, rotaviruus 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, epide-mics 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, epidemio-logical principles of disease prevention and control.	10	10	Periodic Exam		Test Exam Part -II
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 : Impor-tance 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, Staphylo-coccal food poisoning).	7			7	
Total	**41**	**25**		**16**	

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	Periodic Exam		Test Exam Part -II
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	

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	
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	
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		Periodic Exam	4	Test Exam Part -II
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				
Weighment 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	Periodic Exam	JAN-MARCH (6-8) Weeks	Test Exam Part -III
ENZYMES & COENZYMES : **ENZYMES :** Definition & Classification, Kinetics (Gibbs free energy change, Reaction initiation energy), Michalies-Menten equation, Reciprocal plot & its significance, Vmax & Km, substrate specificity, enzyme inhibition (irreversible- Penicillin inhibition, reversible explained from Reciprocal plot, allotter-ribonucleotide reductase inhibition by nucleotides), isozymes-ex. LDH. **COENZYMES :** Definition, Biochemical Functions of : NAD, NADP, FAD, CoA, Tetrahydrofolate, TPP. Names of the Vitamines present in those coenzymes	8 + 2 =10				
CARBOHYDRATES : Glycolysis, Citric acid cycle, Electron transport chain (brief idea), glycogenesis, glycogenolysis, gluconeogenesis.HMP Shunt.	8 + 2 = 10				
LIPID : Beta-Oxidation, (alpha and omega oxidation-definition only), Synthesis & utilization of ketone bodies, Ketosis, Causes of fatty liver.	6				
PROTEIN : Tertiary & Quartinary structures of protein with Haemoglobin & Collagen as examples, Deamination & Transamination, amino acid metabolism.		8 + 2 = 10			
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) & Machineries needed in each step(only names of the enzymes and coenzymes).		6			
VITAMINES : Structure & Biochemical roles, Deficiency disorders of Vitamin A, D, E.K, B1, B2, B6, Folic acid, Pantothenic acid, Niacin & Vitamin C.		4			
MINERALS : Biochemical functions of Na, K, Ca, P, I, Fe, Se - Disorders related to Hyperactivity & Deficiencies of those elements.		4			
CELLULAR TRANSPORT : Preliminary idea about membrane permeability, Active & Passive transport, Facilitated transport, a brief idea about gated-channels & membrane-bound transport protein.		4			
Microscope : - Different parts of microscope and its functions	3				

Paper V: (unit I+II)100 marks Biochemistry, Food Microbiology	No. of Lectures (7-8) Weeks	JUL-DEC. (10-12) Weeks	Periodic Exam	JAN-MARCH (6-8) Weeks	Test Exam Part -III
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**	

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 :- • Different causes of fever. • Metabolic changes during fever (elementary idea). • General dietary consideration. Causes, clinical features, treatment& dietary management of- o Short time fever(influenza) o Chronic fever (tuberculosis). o Intermittent fever (Malaria).	4		Periodic Exam		Test Exam Part -III
5. **DIET DURING SURGERY :-** • General introduction • Pre & post operative diet (brief idea). • Dietary management. 6. **DISEASES OF LIVER :-** • General introduction • Symptoms of liver diseases. • Reasons of liver diseases. • Basic idea of liver function tests. Causes, clinical features, treatment& dietary management of- o Infective hepatitis & jaundice. o Cirrhosis of liver. o Hepatic coma. o Infantile billiary cirrhosis.	4				
6. **DISEASES OF Gall Stone-** • General introduction • Type of Stones • Dietary Management • Basic idea of liver function tests.	5 + 6 = 11				

	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	Periodic Exam	JAN-MARCH (10-12) Weeks	Test Exam Part -III
Peptic Ulcer • General introduction of peptic ulcer diseases. • Symptoms of peptic ulcer diseases. • cause of peptic ulcer diseases. • mechanism of ulcer formation clinical features, treatment& dietary management 9. **INTESTINAL DISORDERS :-** General introduction and dietary management of different intestinal disorders- o Constipation:-causes, complication, type (in brief), Dietary management. o Flatulence:-causes, treatment, dietary management. o Diarrhoea:-causes, physiological disturbance in the body during Diarrhoea. Different types of Diarrhoea, Symptoms, Complication. Prevention & treatment.ORS. o Steatorrhoea: - causes, treatment, dietary management. o Ulcerative colitis-causes, symptoms, treatment & dietary management. o Irritable bowel syndrome: - causes, symptoms, dietary management.	5	8 + 4 = 12			
Paper VII: (unit I+II)100 marks **Diet Therapy II**	5				
1. **CARDIO VASCULAR DISEASES :-** • General information & brief idea. • Causes or factors of CHD in brief. • Dietary management. Causes, symptoms in brief& dietary management of the following : Atherosclerosis, hypertension, hypercholesterolemia, IHD, Congestive cardiac failure.	8				
2. **RENAL DISEASES :-** • General introduction. Causes, symptoms in brief & dietary management of the following: o Type I or Glomerulonephritis. o Type II or Nephrotic Syndrome. o Acute & chronic renal failure. o Renal calculi.	8				

Paper VII: (unit I+II)100 marks Diet Therapy II	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	Periodic Exam	JAN-MARCH (10-12) Weeks	Test Exam Part -III
3. **DIABETES MELLITUS :-** • 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 :-** • 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 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 Rf value.	12				
GROUP B :- **QUANTITATIVE ESTIMATION** 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.					

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.					
UNIT II :- FOOD PRESERVATION AND PREPARATION (50) 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	Periodic Exam		Test Exam Part -III
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 o Jaundice. o Peptic Ulcer o Diabetes. o Fever. o CHD.	20				

Paper VIII : Unit I :- Diet therapy Practical (35)	No. of Lectures (6-7) Weeks	JUL-DEC. (14-16) Weeks	Periodic Exam	JAN-MARCH (10-12) Weeks	Test Exam Part -III
o Gout. o Renal Failure(acute or chronic). o Obesity.					
Paper VIII Unit II : - Microbiology Practical (30)		14			
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	
1. Review and project work. 2. Seminar presentation.					
Total	**32**	**34**		**10**	

Department of Chemistry
TEACHING PLAN

SESSION 2017-2018
(1+1+1 System) Degree Course (General) B.Sc

Part-I (1st Year) : Paper-I

Heading of the Chapter	No. of Lectures	Marks	JUL-DEC No. of Lectures	JAN-UNE No. of Lectures				
				Mid term Examination		Test Examination	Study leave and Counselling	Part I Examination
CEMGT 11A								
UNIT-1 : Basic Physical Chemistry I								
1. a. Gaseous State	(10-15)							
1. b. Liquid State	(4-5)	12	10		8			
1. c. Crystalline state	(3-5)							
UNIT-II : Basic Physical Chemistry II								
2. a. Defination of thermo-dynamic Terms	(3-4)		4		7			
2. b. First law of thermodynamics	(8-10)	13						
2. c. Accplication of First Law	(8-10)							
CEMGT 11B								
UNIT-I : General Chemistry								
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)							
1. b. Alkanes, alkenes & alkynes	(8-10)	12	10		8			
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. d. Organometallic Compounds	(2-4) (4-8)							
CEMGT 11D								
UNIT-I : **Basic Inorganic Chemistry** 1. a. Ionic bonding 1. b. Covalent bonding	 (6-8) (10-12)	12	12		7			
UNIT-II : **Basic Organic Chemistry II** 2. a. Chemical periodicity 2. b. Comparative Study of P block elements	 (10-15) (8-10)	13	15		6			

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SESSION 2017-2018
(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				
				Mid term Examination		Test Examination	Study leave and Counselling	Part II Examination
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								
1. a. Acid-bases and solvents	(8-10)	12	12					
1. b. Solutions of electrolyte	(6-8)				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 derivaties	(3-5)							
1. c. Carbohydrates	(6-8)							
UNIT-II : **Basic Organic Chemistry IV**								
2. a. Phenole	(2-4)							
2. b. Organic Compound Containing nitrogen	(8-10)	13	10		8			
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	Part II Examination
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				
				Mid term Examination		Test Examination	Study leave and Counselling	Part II Examination
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. Pesticiates	(2-4)							
2. c. Food Additives	(3-5)							

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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 Weeks (9-10) No. of Lectures	Class Test	OCT-DEC Weeks (6-8) No. of Lectures	JAN-FEB Weeks (5-6) No. of Lectures	Periodical Examination	Periodical Examination	MAR-APR	Part I Examination
	Group A										
Algae	General characters, Features of different classes, Cyanobacteria, Alternation of generation Economic importance	10	10	5		3	1			1	
Fungi and Lichen	General Character & spore type, Features of different groups, Anamorph & Telomorph, Mycorrhiza, Lichen, Economic importance	10	10	3		3	2			2	
Pathology	Terms & Definitation, Disease, Disease triangle & Management, Koch's Postulate, Phytoalaxin, Disease cycle and control Measures, Tungrovirus disease of rice, Late Blight of Potato	10	7	3		2	1			1	
Micro-biology	General character of Microsbs, 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				
	TOTAL	40	35	16		10	5			4	

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Paper Units	Headline of the Subject	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	Class Test	OCT-DEC Weeks (6-8) No. of Lectures	Periodical Examination	JAN-APR Weeks (10-12) No. of Lectures	Periodical Examination	MAY-APR	Part I Examination
Bryophyta	*Group B* General Characters, Representative of diffferent groups,	8	4	1		2		1			
Pteridophyta	General characters, different with other groups. Representative of different groups.	8	4	2		1		1			
Gymnosperms	General characterics, Evolution, Representative of different groups.	8	4	3		1		—			
Paleobotaly	Fossiligation process	6	3	2		1					
	TOTAL	30	15	8		5		2			
	Group C										
Morphology of angiosperm	Types of influrens, 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, Benthane and Hookers, Classification, Different families	20	10	2		5		2		1	
	TOTAL		15	6		6		2		1	

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PART–II

SESSION 2017-2018

1+1+1 Degree Course (General)

Paper Units	Headline of the Subject	Marks	No. of Lectures	JUL-SEPT Weeks (9-10) No. of Lectures	Class Test	OCT-DEC Weeks (6-8) No. of Lectures	JAN-FEB Weeks (5-6) No. of Lectures	Periodical Examination		Periodical Examination	MAR-JUNE	Part I Examination
II	*1. Group A*											
	Anatomy: Cell wall, Stomata, Evolution of stelar type, Shoot apex, & root apex, Secondry growth	10	8			4	4					
	Embryology : Sporogenesis & gametogenesis, Embryo development in *Capsella bursa-pastoris.* 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, mendilean basis of inheritance, Linkage, Sex determination, testcross and back cross, genetic map, three point test cross,	30	25			15	5				5	

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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-APR Weeks (10-12) No. of Lectures			MAY-JUNE	
	Biochemistry: Biomolecules : structure and application, Enzymes. **Plant Physiology :** Transpiration, k^+ Ion effect and transport, Photosynthesis, Respiretion, 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 Deprtmental 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.