BANKURA UNIVERSITY

(West Bengal Act XIX of 2013- Bankura University Act, 2013)

Main Campus, Bankura Block-II, P.O.: Purandarpur, Dist.: Bankura, Pin- 722155, West Bengal

Office of the Secretary

Faculty Council for Undergraduate Studies

Ref: BKU/FCUG/226/2024 Date: 22/08/2024

NOTIFICATION

As directed, the undersigned is pleased to inform all concerned that Bankura University has initiated the process to implement New Curriculum and Credit Framework for Undergraduate Programme, UGC 2022 (as per NEP 2020) for 4-years Undergraduate programme with Zoology as Major, Minor etc. from the academic session 2023-2024. The Syllabus for the purpose will be framed and finalized as per the guidelines of appropriate authority. As an important corollary to the process, the workshop will be organized on the date mentioned herewith to get the feedback from the stakeholders. Present Students, Alumni, Guardians, Academicians and other stakeholders related to the specific programme/course are requested for their kind participation in the workshop and to present their views/ observations etc. The stakeholders may go through the draft syllabus attached herewith and convey their observations to the office of the undersigned on ugsecretaryoffice@bankurauniv.ac.in within seven days from the date of publication of notice.

T.A. will not be provided for the purpose.

Date: 25.08.2024

Time: 7PM

Google Meet joining info Video call link: https://calendar.app.google/aRu7AfPjy7s1VyHo8

Sd/-
Dr. Arindam Chakraborty
Secretary
Faculty Council for Undergraduate Studies

Syllabus for
Four Years Undergraduate Courses in Zoology

[New Curriculum and Credit Framework for undergraduate Programme]

Following NEP 2020

With effect from the Academic Session 2023-2024]

BANKURA UNIVERSITY

BANKURA

WEST BENGAL

PIN 722155

Bankura University

Programme and Course Structure with Credit Distribution: UG Degree Programmes with Single Major

Category of Course (credit) / SEM	Major (4) DSC	Major (4) DSE	Minor Stream (4)	Multidisciplinary (3)	Ability Enhancement Courses (AEC) (2)	Skill Enhancement Courses (SEC) (3)	Value Added Courses common for all (4)	Summer Internship (2)	Research Project / Dissertation* (12)	TOTAL CREDIT / NUMBER OF COURSES
I	4		4	3	2	3	4			20
II	4		4	3	2	3	4			20
CERTIFICATE (Total credit)	**8**		**8**	**6**	**4**	**6**	**8**	4*(ADDITIONAL)		**40**
III	8		4	3	2	3				20
IV	16		4		2					22
DIPLOMA (Total credit)	**32**		**16**	**9**	**8**	**9**	**8**	4*(ADDITIONAL)		**82**
V	8	8	4					2		22
VI	8	8	4							20
UG DEGREE (Total credit)	**64**		**24**	**9**	**8**	**9**	**8**	**2**		**124**
VII	4	12	4							20
VIII	4	12**	4							20
UG HONS. (total credit)	**96**		**32**	**9**	**8**	**9**	**8**	**2**		**164**
UG HONS. WITH RESEARCH (Total credit)	**84**		**32**	**9**	**8**	**9**	**8**	**2**	12**	

Undergraduate Courses in Zoology

Courses	Duration	Semesters	Credits	Criteria of Admission /Re entry
Certificate course in Zoology	1 year	I & II	40+ 4 (Voc)	12+ Pass with Biology
Diploma course in Zoology	2 years	I-IV	82+ 4 (Voc)	Certificate in Zoology
B.Sc degree in Zoology	3 years	I-VI	124+2(Voc)	Diploma in Zoology
B.Sc (Honours) in Zoology	4 years	I-VIII (without dissertation)	164	3 years B.Sc degree in Zoology
B.Sc (Honours with Research) in Zoology	4 years	I-VIII (with dissertation)	164	3 years B.Sc degree in Zoology with average at least 75% marks.

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Curriculum and Credit Framework for ZOOLOGY

(Basic, Honours and Honours with Research)

With effect from the Academic Year 2023-2024

SEMESTER–I

Sl.No.	Course Code	Course Title	Credit	Marks			No.of Hours		
				IA	ESE	Total	L	T	P
1	DSC-01	Non chordate Diversity	4 (3+1)	10	40 (T:25, L:15)	50	3	0	2
2	MNS-01	Non chordate	4 (3+1)	10	40 (T:25, L:15)	50	3	0	2
3	MDC-01	Sericulture and Silk Production Technology	3	10	40 (T:40)	50	3	0	0
4	AECC-01		2						
5	SEC-01	Sericulture	3	10	40 (T:40)	50	3	0	0
6	VAC-01		4						
Total in Semester-I			**20**						

SEMESTER–II

Sl.No.	Course Code	Course Title	Credit	Marks			No.of Hours		
				IA	ESE	Total	L	T	P
1	DSC-02	Chordate Diversity and Comparative Anatomy of Vertebrates	4 (3+1)	10	40 (T:25, L:15)	50	3	0	2
2	MNS-02	Chordate and Comparative Anatomy	4 (3+1)	10	40 (T:25, L:15)	50	3	0	2
3	MDC-02	Environment and Public Health Management	3	10	40 (T:40)	50	3	0	0
4	AECC-02		2						
5	SEC-02	Aquarium Fish Management	3	10	40 (T:40)	50	3	0	0
6	VAC-02		4						
Total in Semester-II			**20**						

- Major Courses in Zoology are for the students who opted for Certificate/Diploma/Degree in Zoology
- Minor Courses in Zoology for the students opted whose major courses other than Zoology.
- Multidisciplinary subject (for the students who do not studied the subject in H.S. level).
- Skill Enhancement Course (SEC) for the students of Zoology Major.
- Summer Internship one of 4 credits is compulsory within 1st year for Certificate, within 2nd year for Diploma, within 3 year for degree and within 4th year for Degree with Honours.

Zoology Major

Semester- I

Paper I : Non chordate Diversity (Theory) 3 Credits

Unit 1: Introduction

Coelom: Types, Evolution and significance

Unit 2: Basics of Animal Classification

1. Definitions: Classification, Systematics and Taxonomy: Taxonomic Hierarchy, Taxonomic types
2. Codes of Zoological Nomenclature; Principle of priority; Synonymy and Homonymy; Six kingdom concept of classification (Carl Woese)

Unit 3: Protista

Protozoa:

General characteristics and classification up to phylum (Levine et. al., 1981)

Locomotion in Protozoa with special reference to *Euglena*, *Paramoecium* and *Amoeba*; Conjugation in *Paramoecium.*

Unit 4: Porifera

1.General characteristics and classification up to Classes (Hyman 1940)

2.Canal system and spicules in sponges

Unit 5: Cnidaria

1. General characteristics and classification up to classes
2. Metagenesis in *Obelia*
3. Corals and coral reef diversity, function & conservation

Unit 6: Platyhelminthes

General characteristics and classification up to classes

Unit 7: Nematoda

1. General characteristics and classification up to classes
2. Parasitic adaptations in helminthes

Unit 8: Annelida

1. General characteristics and classification up to classes
2. Reproduction in earthworm.

Unit 9: Arthropoda

1. General characteristics and classification up to classes
2. Social life in termite
3. Insect Metamorphosis

Unit 10: Onychophora

General characteristics and Evolutionary significance of *Peripatus*

Unit 11: Mollusca

1. General characteristics and Classification up to classes
2. Nervous system and torsion in Gastropoda

Unit 12: Echinodermata

1. General characteristics and Classification up to classes
2. Water-vascular system in *Asterias*

Unit 13: Hemichordata

1. General characteristics of phylum Hemichordata.
2. Evolutionary significance of Hemichordates

Note: Classification to be followed from Barnes and Ruppert 1994, 6th Edition

Reference Books

Barnes, R. D. & Ruppert, E. E., (1994). Invertebrate Zoology. 6thEd. Brooks Cole
Brusca, R. C. & Brusca, G. J. (2002). Invertebrates. 4th Ed. Sinauer Associates
Mandal FB (2015), Human Parasitology 2nd Edition, PHI Learning
Kapoor, V. C. (2008). Theory and practice of animal taxonomy. 6th Ed. Oxford & IBH Pub
Mayr, E. (1969). Principles of Systematic Zoology. Tata McGraw-Hill.
Mayr, E. & Ashlock, P. D. (1991). Principles of Systematic Zoology. 2nd Ed., McGraw-Hill.
Meglitsch, P. A. & Schram, F. R. (1991). Invertebrate Zoology. Oxford University Press
Pechenik, J. A. (1998). Biology of the Invertebrates, 4th Ed. McGraw Hill
Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.
Sinha, K. S., Adhikari, S., & Ganguly, B. B. Biology of Animals. Vol. I. New Central Book Agency. Kolkata

Paper I : Non chordate Diversity (Practical) 1 Credit

Practicals

1. Identification of following specimen
   Amoeba, Euglena, , Paramecium, Sycon, Fasciola, Ascaris Physalia, Aurelia, , Gorgonia, Metridium, Pennatula, Fungia, Aphrodite, Pheretima, Hirudinaria, Balanus, Eupagurus, Scolopendra, Peripatus,Chiton, Pinctada, Octopus, Nautilus, Asterias, Balanoglossus
2. Identification of T.S. through pharynx, gizzard, and typhlosolar intestine of earthworm
3. Dissection of digestive system and nervous system of earthworm
4. Dissection of reproductive system of earthworm
5. Dissection: digestive system and nervous system of Cockroach
6. a. Mounting of mouth parts of Cockroach
   b. Staining and mounting of any protozoa/helminthes from gut of cockroach.
7. Submission of Laboratory Note Book

Distribution of Marks

Examination Pattern:	**Full marks: 15**
1. Identification with reasons (any three):	3x2= 6
2. Dissection (any one) (From Item no. 3, 4 and 5)	4 [2+1=1]
3. Staining/ Mounting (any one) (From Item no. 6):	3 [1+1+1]
4. Laboratory Note book	2

***Note:**
Q1. For Item (1), Sc. name:0.5 mark, Systematic Position 0.5 and Reasons: 1 marks.

For Item (2) 1 mark is allotted for both identification and characters.

Suggested readings:

Ghosh, K.C. and Manna, B. (2015):Practical Zoology, New Central Book Agency, Kolkata
Poddar T. K., S. Mukherjee & S. K. Das (2002) An Advanced Laboratory Manual of Zoology, Laxmi Publications
Sinha, J.K. , Chatterjee, A.K. and P. Chattopadhyay (2015) Advanced Practical Zoology

Zoology Major

Semester -II

Paper II : Chordate Diversity and Comparative Anatomy of Vertebrate (Theory) 3 Credits

Group A

Unit 1: Introduction to Chordates

Origin of Chordate (Dipleurula concept and the Echinoderm theory)

Unit 2: Urochordata and Cephalochordata

1. General characteristics and classification of Urochordata and Cephalochordata up to Classes.
2. Retrogressive metamorphosis in *Ascidia*.

Unit 3: Agnatha

General characteristics and classification of cyclostomes up to order

Unit 4: Pisces

1. General characteristics and classification of Chondrichthyes and Osteichthyes up to Subclasses
2. Migration in fishes
3. Structure and function of Swim bladder

Unit 5: Amphibia

1. General characteristics and classification up to living Orders.
2. Parental care in Amphibia

Unit 6: Reptilia

1. General characteristics and classification up to living Orders.
2. Poison apparatus and biting mechanism in snakes

Unit 7: Aves

1. General characteristics and classification up to Sub-Classes
2. Migration in birds
3. Aerodynamics of flight

Unit 8: Mammals

1. General characters and classification up to living orders
2. Affinities and phylogeny of Monotremata
3. Echolocation in micro chiropterans

GROUP B

Unit 9: Integumentary System

Structure, function and derivatives of integument in amphibian, birds and mammals

Unit 10: Skeletal System

General idea of Axial and appendicular Skeleton

Unit 11: Digestive System

Ruminating stomach; dentition in mammals

Unit 12: Respiratory System

Respiratory organs in fish, amphibian, and birds

Unit 13: Circulatory System

Comparative account of heart and aortic arches

Unit 14: Urinogenital System

Archinephros, Pronephros, Mesonephros and MetanephrosEvolution of urinogenital ducts,

Unit 15: Nervous System
Comparative account of brain, Cranial nerves in mammals

Unit 16: Sense Organs
Classification of receptors

Note: Classifications for Protochordata, Agnatha, Reptilia, Aves and Mammalia to be followed from Young (1981), for Pisces to be followed from Romer (1959), for Amphibia to be followed from Nobel (1924).

Reference Books

Darlington P.J. The Geographical Distribution of Animals, R.E. Krieger Pub Co.
Futuyama, D. (1997). Evolutionary Biology. 3rd Ed. Sinauer Associates, INC.
Hall B.K. and Hallgrimsson B. (2008). Strickberger's Evolution. IV Edition. Jones and Bartlett Publishers Inc.
Jordan, E.L. &Verma, P.S. (2003). Chordate Zoology. S. Chand & Company Ltd. New Delhi.
Kardong, K. V. (2002). Vertebrates: Comparative anatomy, function evolution. Tata McGraw Hill.
Kent, G. C. & Carr, R. K. (2001). Comparative anatomy of the Vertebrates. 9th Ed. McGraw Hill.
Mandal FB (2013) Vertebrate Zoology, Oxford and IBH Co Pvt Ltd, New Delhi
Nelson, J.S., (2006): Fishes of the World, 4th Edn., Wiley.
Parker, T. J. &Haswell, W. (1972). Text Book of Zoology, Volume II: Marshall and Wiliam (Eds.) 7th Ed. Macmillan Press,London.
Pough H. Vertebrate life, VIII Edition, Pearson International.
Romer, A. S. & Parsons, T. S. (1986). The vertebrate body. 6th Ed. Saunders College Publishing.
Sinha, K. S., Adhikari, S., Ganguly, B. B. &BharatiGoswami, B. D. (2001). Biology of Animals. Vol. II. New Central Book Agency (p) Ltd.
Young, J. Z. (2004). The Life of Vertebrates. Ill Edition. Oxford university press.
Kardong, K.V. (2005) Vertebrates' Comparative Anatomy, Function and Evolution. IV Edition. McGraw-Hill Higher Education
Kent, G.C. and Carr R.K. (2000). Comparative Anatomy of the Vertebrates. IX Edition. The McGraw-Hill Companies
Hilderbrand, M (1988) . Analysis of Vertebrate Structure. 3rd Edition, John Wiley and Sons
Saxena, R.K. &Saxena, S.C.(2008): Comparative Anatomy of Vertebrates, Viva Books Pvt. Ltd.

Paper II : Chordate Diversity and Comparative Anatomy of Vertebrates (Practical) 1 Credits

Practicals

1. Identification of following specimen
   Branchiostoma, Petromyzon, Scoliodon, Torpedo, Heteropneustes, Exocoetus, Hippocampus, Necturus, Bufo, Tylototriton, Chelone,, Chamaeleon, Draco, , Vipera, Naja, Alcedo, Psittacula, Pteropus, Funambulus,
2. Identification of disarticulated skeleton of Pigeon and Guineapig [Skull, Vertebrae (Atlas, Axis) , Pectoral girdle, Pelvic girdle],
3. Mounting of Pecten from Fowl head
4. Staining and mounting of Placoid, Cycloid and Ctenoid scales
5. Dissect out brain of carp
6. Dissection: Afferent branchial arterial system and IX and Xth Cranial nerves of carp
7. Submission of Laboratory Note Book

Distribution of Marks

Examination Pattern:	**Full marks: 15**
1. Identification with reasons (any three;)	6 (2+2+2)*
2. Mounting and staining	2
3. Dissection	5 [3+1+1]*
4. Submission of laboratory note book:	2

Zoology Minor

Semester- I

Paper I : Non chordate (Theory) 3 Credits

Unit 1: Introduction

Coelom: Types, Evolution and significance

Unit 2: **Basics of Animal Classification**

1. Definitions: Classification, Systematics and Taxonomy: Taxonomic Hierarchy, Taxonomic types
2. Codes of Zoological Nomenclature; Principle of priority; Synonymy and Homonymy; Six kingdom concept of classification (Carl Woese)

Unit 3: Protista

1. Protozoa:

General characteristics and classification up to phylum (Levine et. al., 1981)

Locomotion in Protozoa with special reference to *Euglena*, *Paramoecium* and *Amoeba*; Conjugation in *Paramoecium.*

Unit 4: Porifera

1.General characteristics and classification up to Classes (Hyman 1940)

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Unit 5: Cnidaria

1. General characteristics and classification up to classes
2. Metagenesis in *Obelia*
3. Corals and coral reef diversity, function & conservation

Unit 6: Platyhelminthes

1. General characteristics and classification up to classes

Unit 7: Nematoda

1. General characteristics and classification up to classes
2. Parasitic adaptations in helminthes

Unit 8: Annelida

1. General characteristics and classification up to classes
2. Reproduction in earthworm.

Unit 9: Arthropoda

1. General characteristics and classification up to classes
2. Social life in termite
3. Insect Metamorphosis

Unit 10: Onychophora

General characteristics and Evolutionary significance of *Peripatus*

Unit 11: Mollusca

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Unit 12: Echinodermata

1. General characteristics and Classification up to classes
2. Water-vascular system in *Asterias*

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1. General characteristics of phylum Hemichordata.
2. Evolutionary significance of Hemichordates

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Paper I : Non chordate (Practical) 1 Credit

Practicals

1. Identification of following specimen
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2. Identification of T.S. through pharynx, gizzard, and typhlosolar intestine of earthworm
3. Dissection of digestive system and nervous system of earthworm
4. Dissection of reproductive system of earthworm
5. Dissection: digestive system and nervous system of Cockroach
6. a. Mounting of mouth parts of Cockroach
   b. Staining and mounting of any protozoa/helminth from gut of cockroach.
7. Submission of Laboratory Note Book

Distribution of Marks

Examination Pattern: **Full marks: 15**

1.	Identification with reasons (any three):	3x2= 6 *
2.	Dissection (any one) (From Item no. 3, 4 and 5)	3 [2+1]
3.	Staining/ Mounting (any one) (From Item no. 6):	4 [2+1+1]
4.	Laboratory Note book	2

***Note:**
Q1. For Item (1), Sc. name:0.5 mark, Systematic Position 0.5 and Reasons: 1 marks.

For Item (2) 1 mark is allotted for both identification and characters.

Suggested readings:
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Zoology Minor

Semester -II

Paper II : Chordate and Comparative Anatomy (Theory) 3 Credits

Group A

Unit 1: Introduction to Chordates

Origin of Chordate (Dipleurula concept and the Echinoderm theory)

Unit 2: Urochordata and Cephalochordata

3. General characteristics and classification of Urochordata and Cephalochordata up to Classes.
4. Retrogressive metamorphosis in *Ascidia*.

Unit 3: Agnatha

General characteristics and classification of cyclostomes up to order

Unit 4: Pisces

4. General characteristics and classification of Chondrichthyes and Osteichthyes up to Subclasses
5. Migration in fishes
6. Structure and function of Swim bladder

Unit 5: Amphibia

3. General characteristics and classification up to living Orders.
4. Parental care in Amphibia

Unit 6: Reptilia

3. General characteristics and classification up to living Orders.
4. Poison apparatus and biting mechanism in snakes

Unit 7: Aves

4. General characteristics and classification up to Sub-Classes
5. Migration in birds
6. Aerodynamics of flight

Unit 8: Mammals

4. General characters and classification up to living orders
5. Affinities and phylogeny of Monotremata
6. Echolocation in micro chiropterans

GROUP B

Unit 9: Integumentary System

Structure, function and derivatives of integument in amphibian, birds and mammals

Unit 10:

General idea of Axial and appendicular Skeleton

Unit 11: Digestive System

Ruminating stomach; dentition in mammals

Unit 12: Respiratory System

Respiratory organs in fish, amphibian, and birds

Unit 13: Circulatory System

Comparative account of heart and aortic arches

Unit 14: Urinogenital System

Archinephros, Pronephros, Mesonephros and MetanephrosEvolution of urinogenital ducts,

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Comparative account of brain, Cranial nerves in mammals

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Note: Classifications for Protochordata, Agnatha, Reptilia, Aves and Mammalia to be followed from Young (1981), for Pisces to befollowed from Romer (1959), for Amphibia to be followed from Nobel (1924).

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Kent, G.C. and Carr R.K. (2000). Comparative Anatomy of the Vertebrates. IX Edition. The McGraw-Hill Companies
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Paper II : Chordate and Comparative Anatomy (Practical) 1 Credits

Practicals

1..Identification of following specimen
Branchiostoma, Petromyzon, Scoliodon, Torpedo, Heteropneustes, Exocoetus, Hippocampus, Necturus, Bufo, Tylototriton, Chelone,, Chamaeleon, Draco, , Vipera, Naja, Alcedo, Psittacula. Pteropus, Funambulus,
2. Identification of disarticulated skeleton of Pigeon and Guineapig [Skull, Vertebrae (Atlas, Axis) and Pectoral girdle, Pelvic girdle],
3. Mounting of Pecten from Fowl head
4. Staining and mounting of Placoid, Cycloid and Ctenoid scales
5. Dissect out brain of carp
6. Dissection: Afferent branchial arterial system and IX and Xth cranial nerves of carp
7. Submission of Laboratory Note Book

Distribution of Marks

Examination Pattern:	**Full marks: 15**
3. Identification with reasons (any three;)	6 (2+2+2)*
4. Mounting and staining	2
5. Dissection	5 [3+1+1]*
6. Submission of laboratory note book:	2

Zoology Skill Enhancement Courses (SEC-1)

Sericulture (Theory) 3 Credits

Unit 1: Introduction

Sericulture: Definition, history and present status: Silk route

Types of silkworms, Distribution and Races

Exotic and indigenous races

Mulberry and non-mulberry Sericulture

Unit 2: Biology of Silkworm

Life cycle of *Bombyx mori*

Structure of silk gland and secretion of silk

Unit 3: Rearing of Silkworms

Selection of mulberry variety and establishment of mulberry garden]

Rearing house and rearing appliances.

Disinfectants: Formalin, bleaching powder,

Silkworm rearing technology: Early age and Late age rearing

Types of mountages

Spinning, harvesting and storage of cocoons

Unit 4: Pests and Diseases

Pests of silkworm: Uzi fly, dermestid beetles and vertebrates

Pathogenesis of silkworm diseases: Protozoan, viral, fungal and bacterial

Control and prevention of pests and diseases

Unit 5: Entrepreneurship in Sericulture

Prospectus of Sericulture in India: Sericulture industry in different states, employment, potential in mulberry and non-mulberry sericulture

Visit to any sericulture centre.

Reference Books

Manual on Sericulture; Food and Agriculture Organisation, Rome 1976

Handbook of Practical Sericulture: S.R. Ullal and M.N. Narasimhanna CSB, Bangalore

Silkworm Rearing and Disease of Silkworm, 1956, Ptd. By Director of Ptg., Stn. & Pub. Govt. Press, Bangalore

Appropriate Sericultural Techniques; Ed. M. S. Jolly, Director, CSR & TI, Mysore.

Handbook of Silkworm Rearing: Agriculture and Technical Manual-1, Fuzi Pub. Co. Ltd., Tokyo, Japan1972.

Manual of Silkworm Egg Production; M. N. Narasimhanna, CSB, Bangalore 1988.

Silkworm Rearing; Wupang—Chun and Chen Da-Chung, Pub. By FAO, Rome 1988.

A Guide for Bivoltine Sericulture; K. Sengupta, Director, CSR & TI, Mysore 1989.

Improved Method of Rearing Young age silkworm; S. Krishnaswamy, reprinted CSB, Bangalore, 1986

Zoology Skill Enhancement Courses (SEC-2)

Aquarium Fish Management (Theory) 3 Credits

Unit 1: Introduction to Aquarium Fish Keeping
The potential scope of Aquarium Fish Industry as a Cottage Industry, Exotic and Endemic species of Aquarium Fishes, Setting of freshwater aquarium

Unit 2: Biology of Aquarium Fishes
Common characters and sexual dimorphism of Fresh water and Marine Aquarium fishes such as Guppy, Molly, Sword tail, Gold fish, Angelfish, Blue morph, Anemone fish and Butterfly fish

Unit 3: Food and feeding of Aquarium fishes
Use of live fish feed organisms. Preparation and composition of formulated fish feeds, Aquarium fish as larval predator

Unit 4: Fish Transportation
Live fish transport - Fish handling, packing and forwarding techniques.

Unit 5: Maintenance of Aquarium
General Aquarium maintenance - budget for setting up an Aquarium Fish Farm as a Cottage Industry

Zoology Multidisciplinary Paper-1

Sericulture and Silk Production Technology (Theory) 3 Credits

Unit 1: Introduction
Sericulture: Definition, history and present status: Silk route
Types of silkworms,
Mulberry and non-mulberry Sericulture

Unit 2: Biology of Silkworm
Life cycle of *Bombyx mori*
Structure of silk gland, Composition of Silk and secretion of silk

Unit 3: Rearing of Silkworms
Selection of mulberry variety and establishment of mulberry garden
Rearing house and rearing appliances.
Disinfectants: Formalin, bleaching powder,
Types of mountages
Spinning, harvesting and storage of cocoons

Unit 4: Pests and Diseases
Pathogenesis of silkworm diseases: Protozoan, viral, fungal and bacterial

Unit 5: Entrepreneurship in Sericulture
Prospectus of Sericulture in India: Sericulture industry in different states, employment, potential in mulberry and non-mulberry sericulture

Reference Books

Manual on Sericulture; Food and Agriculture Organisation, Rome 1976

Handbook of Practical Sericulture: S.R. Ullal and M.N. Narasimhanna CSB, Bangalore

Silkworm Rearing and Disease of Silkworm, 1956, Ptd. By Director of Ptg., Stn. & Pub. Govt. Press, Bangalore

Appropriate Sericultural Techniques; Ed. M. S. Jolly, Director, CSR & TI, Mysore.

Handbook of Silkworm Rearing: Agriculture and Technical Manual-1, Fuzi Pub. Co. Ltd., Tokyo, Japan1972.

Manual of Silkworm Egg Production; M. N. Narasimhanna, CSB, Bangalore 1988.

Silkworm Rearing; Wupang—Chun and Chen Da-Chung, Pub. By FAO, Rome 1988.

A Guide for Bivoltine Sericulture; K. Sengupta, Director, CSR & TI, Mysore 1989.

Improved Method of Rearing Young age silkworm; S. Krishnaswamy, reprinted CSB, Bangalore, 1986

Zoology Multidisciplinary Paper-II

Environment and Public Health Management (Theory) 3 Credits

Unit 1: Introduction
Sources of Environmental hazards,
,

Unit 2: Climate Change
Greenhouse gases and global warming, Acid rain, Ozone layer destruction, Effect of climate change on public health

Unit 3: Pollution
Air, water, noise pollution: sources, effects and control,

Unit 4: Waste Management Technologies
Sources of waste, types and characteristics, Solid waste disposal, Biomedical waste handling anddisposal, e-waste management,
3 R principle of waste management

Unit 5: Diseases
Causes, symptoms and control of tuberculosis, Cholera, Minamata disease,
Causes, symptoms and control of mosquito borne diseases – Malaria and Dengue
Control of Mosquitoes

Reference Books

Cutter, S.L., Environmental Risk and Hazards, Prentice-Hall of India Pvt. Ltd., New Delhi, 1999.

Joseph F Louvar and B Diane Louver Health and Environmental Risk Analysis fundamentals with applications, Prentice Hall, New Jersey 1997.

Kasperson, J.X. and Kasperson, R.E. and Kasperson,R.E., Global Environmental Risks, V.N.University Press, New York, 2003.

Kofi Asante Duah "Risk Assessment in Environmental management", John Wiley and sons, Singapore, 1998.

Kolluru Rao, Bartell Steven, Pitblado R and Stricoff "Risk Assessment and Management Handbook", McGraw Hill Inc., New York, 1996.

UKImms, A.D. (1977). A General Text Book of Entomology. Chapman & Hall, UK

Mathews, G. (2011). Integrated Vector Management: Controlling Vectors of Malaria and Other Insect Vector Borne Diseases. Wiley-Blackwell

Mosquito (2000) Chandra G, Sribhumi Publication Co. Kolkata Medical Entomology, Hati A. K Allied Book Agency, Kolkata