



**MAHARASHTRA EDUCATION SOCIETY'S
ABASAHEB GARWARE COLLEGE**

KARVE ROAD, PUNE.

(AUTONOMOUS)

Affiliated to Savitribai Phule Pune University

Three Year B.Sc Degree Program in Zoology

(Faculty of Science and Technology)

Syllabi Under Autonomy

F.Y. B.Sc. (Zoology)

Choice Based Credit System Syllabus

To be implemented from Academic Year 2022-2023

Title of the course: BSc (Zoology)

Preamble:

Animal life makes a huge impact on our world. Zoology helps us make sense of the beautiful nature around us through the scientific study of the animals, their evolution, behaviour, anatomy, physiology etc. It deals with the man animal association, interaction and conflicts. Zoology also enables us to understand human health issues. It includes diverse approaches such as taxonomy, genetics, biochemistry, molecular biology, field zoology and many more. Modern tools and techniques help us broaden our vision.

The well-organized curricula including basic as well as advanced concepts in Zoology from first year to third year shall inspire the students for pursuing higher studies in Zoology. At the same time it will also enable them to become an entrepreneur. It shall also help students to get employed in the Biological research Institutes, Industries, Educational Institutes and in the various departments of State as well as Central Government.

Program Outcome

After completion of the B. Sc. Zoology program, students will acquire a better understanding of many areas of the subject. They will gain the knowledge of animal diversity and taxonomy; field zoology; the structures, functions and life processes at all levels of biological organization; basic concepts of human health and hygiene; genetics and molecular aspects of life processes; significance of evolution and applications of Zoology to solve environmental problems. The students would also gain an insight into laboratory and field techniques through the practical courses and field work. Modern tools such as Biostatistics and Bioinformatics will broaden their vision to keep pace with advances in Life-sciences. Students will also understand how pressures of economic growth affect the biodiversity and conservation efforts.

At **first year of under-graduation** the topics related to the fundamentals of zoology, including exposure to diversity in animal groups, classical and neo taxonomy, significance of taxonomy are covered. The practical course is aimed to equip the students with skills required for animal identification, morphological, anatomical, technical description and classification. Once the students understand zoology and nature, they will understand the co-existing harmony between animals and the ecological balance.

Parasitology is an important part of biology. The dynamic process that is established between parasite and host, in terms of molecular matrix, parasitic adaptation, modifications induced by the host, pathogenesis, clinical manifestations, diagnosis, and treatment. There are several parasite species capable of producing epidemics, especially through water and food.

Further, on the background of current pandemic, Introduction of 'Public health and hygiene' in the first year syllabus was need of the hour. The syllabus is designed to introduce the public health issues, concepts of epidemics and pandemics and related hygiene practices. It also introduces the vaccines types to give a better insight to the global vaccination programs.

Eligibility: 12th Science Pass

Structure of the Course

Year	Semester	Course Type	Course Code	Course Title	Remark	Credit	No. of Lectures / Practicals to be conducted
I	I	CC	USZO-111	Animal Diversity-I	Theory	2	36
	I	CC	USZO-112	Parasitology	Theory	2	36
	I	CC	USZOP-113	Zoology Practical-I	Practical	1.5	12
I	II	CC	USZO-121	Animal Diversity-II	Theory	2	36
	II	CC	USZO-122	Public Health And Hygiene	Theory	2	36
	II	CC	USZOP-123	Zoology Practical-II	Practical	1.5	12
II	III	CC	USZO-231	Animal Diversity-III	Theory	2	36
		CC	USZO-232	Applied Zoology -I	Theory	2	36
		CC	USZOP-233	Zoology Practical-III	Practical	2	12
		AECC	UEVS-231	Environment Awareness	Theory	2	36
		AECC	USLG-231	Language	Theory	2	36
II	IV	CC	USZO-241	Animal Diversity-IV	Theory	2	36
		CC	USZO-242	Applied Zoology -II	Theory	2	36
		CC	USZOP-243	Zoology Practical-IV	Practical	2	12
		AECC	UEVS-241	Environment Awareness	Theory	2	36

		AECC	USLG-241	Language	Theory	2	36
III	V	DSEC	USZO-351:	Animal Diversity-V	Theory	2	36
		DSEC	USZO-352:	Cell Biology	Theory	2	36
		DSEC	USZO-353:	Genetics	Theory	2	36
		DSEC	USZO-354:	Biochemistry	Theory	2	36
		DSEC	USZO-355:	Histology	Theory	2	36
		DSEC	USZO-356:	Entomology	Theory	2	36
		DSEC	USZOP- 357:	Zoology Practical-V	Practical	2	12
		DSEC	USZOP- 358:	Zoology Practical-Vi	Practical	2	12
		DSEC	USZOP- 359:	Zoology Practical-Vii	Practical	2	12
		SEC	USZOSEC- 3510	Bio-Statistics	Theory	2	36
		SEC	USZOSEC- 3511	Environmental Problems And Solutions	Theory	2	36
III	VI	DSEC	USZO-361:	Animal Diversity-Vi	Theory	2	36
		DSEC	USZO-362:	Developmental Biology	Theory	2	36
		DSEC	USZO-363:	Molecular Biology	Theory	2	36
		DSEC	USZO-364:	Physiology	Theory	2	36
		DSEC	USZO-365:	Biological Techniques	Theory	2	36
		DSEC	USZO-366:	Evolution	Theory	2	36
		DSEC	USZOP- 367:	Zoology Practical-Viii	Practical	2	12
		DSEC	USZOP-	Zoology	Practical	2	12

			368	Practical-Ix			
		DSEC	USZOP- 369	Zoology Practical-X	Practical	2	12
		SEC	USZOSEC- 3610	Bioinformatics	Theory	2	36
		SEC	USZOSEC- 3611	Field Zoology	Theory	2	36

SEMESTER I

Course code and Name: USZO-111 Animal Diversity-I

Lectures-36

Credits-2

Course Specific Outcome -

1. The student will be able to understand, classify and identify the diversity of animals.
2. The student will understand the importance of classification of animals and classifies them effectively using the six levels of classification.
3. The students will know their role in nature as a protector and conservator of life which they have understood by learning and observing life.

No.	Title & Contents	Number of lectures
1.	Introduction to Animal Diversity and its significance	(L-01)
2.	Principles of classification	(L-08)
	Taxonomy & Systematics	
	2.1 Systematics: definition and introduction	
	2.2 Introduction to Five kingdom classification system	
	2.3 Linnaean system of classification (Six level classification: Phylum, class, order, family, genus and species)	
	2.4 Introduction to Binomial Nomenclature	
	2.5 Concept of Species: Biological & Evolutionary	
	2.6 Taxonomy: Basic terminology and Introduction	
	a. Alpha, Beta and Gamma levels of taxonomy	
	b. Micro-taxonomy & Macro taxonomy: Phenetics (numerical taxonomy), Cladistics (Phylogenetic systematics)	
	c. Evolutionary taxonomy (evolutionary systematics)	
	d. Classical taxonomy and experimental or neo-taxonomy	
	e. Biochemical taxonomy and Cyto-taxonomy.	
	f. Significance of Taxonomy	

3. General Features of kingdom Animalia (L-02)

3.1 General characters of Kingdom Animalia

3.2 Grades of organization & Symmetry.

4. Kingdom Protista (Phylum-Protozoa) (L-08)

4.1 Introduction to Phylum Protozoa

4.2 Salient features of Phylum Protozoa

4.3 Classification of Phylum Protozoa up to classes with two examples (names only).

Class: Rhizopoda e.g.: *Entamoeba histolytica*, *Arcella vulgaris*

Class: Mastigophora e.g.: *Euglena viridis*, *Trypanosoma gambiense*

Class: Ciliata e.g.. *Paramecium caudatum*, *Opalina ranarum*

Class: Sporozoa e.g.. *Plasmodium vivax*, *Toxoplasma gondii*

4.4 Locomotion in Protozoa: Amoeboid, Ciliary and Flagellar with suitable examples

4.5 Type Study: *Paramecium caudatum*: Classification, Habit and Habitat, External morphology, Feeding and digestion, Excretion, Reproduction (binary fission and conjugation)

4.6. Economic importance of Protozoa (one harmful and one useful protozoan)

4.6.1-Harmful Protozoa: *Trypanosoma gambiense*

4.6.2- Useful Protozoa: *Trichonympha*

5. Origin of Metazoa (L-01)

5.1 Introduction, origin and importance of Metazoa.

6. Phylum-Porifera (L-08)

6.1. Introduction to Phylum Porifera

6.2 Classification of Phylum Porifera up to class with two examples of each class (names only)

Class: Calcarea e.g.: *Leucosolenia*, *Sycon*

Class: Hexactinellida e.g.: *Euplectella*, *Hyalonema*

Class: Demospongeae e.g.: *Chalina*, *Spongilla*

6.3 Canal systems in sponges: Ascon, Sycon, Leucon and Rhagon type.

6.4 Skeleton in sponges: Spicules, its types: Microscleres & Megascleres,

Monoaxon – Monactinal, Diactinal, Amphidiscs, Triaxon, Polyaxon, Spongins fibres.

6.5 Gemmules and Regeneration in sponges.

6.6 Economic importance of Phylum Porifera.

7. Phylum-Cnidaria

(L-08)

7.1 Introduction to Phylum Cnidaria

7.2 Salient features of Phylum Cnidaria

7.3 Classification of Phylum Cnidaria up to class level with two examples of each class (names only)

Class: Hydrozoa e.g.: *Hydra*, *Physalia*

Class: Scyphozoa e.g.: *Aurelia*, *Leucernaria*

Class: Anthozoa: e.g.; *Metridium*, *Meandrina*

7.4 Polymorphism in Hydrozoa: Polyps & Medusa (polyp types: gastrozooids, dactylozooids, gonozooids) and functions.

7.5 Economic importance of Cnidarians with reference to Corals and Coral reefs

Reference Books

1. Text Books of Zoology. Vol.11, Invertebrates, 1982, A. J. Marshall and W. D. Williams, ELBS and Macmillan, Hongkong.
2. General Zoology by Goodnight and others IBH Publishing Co.
3. Life of Invertebrates By Prasad,ASN,Vikas Publishing House,New Delhi
4. Phylum Protozoa to Echinodermata (series) By Kotpal, R.L., Rastogi and Co. Meerut
5. Invertebrate zoology By Barnes,Saunders College Publishing Co., Philadelphia, USA, 1987
6. Text Books of Zoology, Invertebrates Vol- II, 1992, T.J.Parker and W.A. Haswel, Edited by Marshall and Williams, CBS publications and distribution, New Delhi.
7. Invertebrates Zoology, E.L. Jordon and P.S. Verma; S. Chand and Co. Ltd., 14th edn
8. Invertebrate Zoology, 1991, Paul, A. Meglitch and Fedricks R. Schram, Oxford University Press, New York.
9. IGCSE Biology, D. G. Mackean, Published by John Murray, London. UK, 2002.
10. Invertebrate Zoology, Edited by D. T. Anderson, Oxford University Press, New York.-Indian Edition by- A.P. Offset, Delhi, 2006.

SEMESTER I

Course code and Name: USZO-112 - Parasitology

Lectures-36

Credits-2

Course Specific Outcome -

1. The students will be able to learn about basics and scope of parasitology.
2. The students will be able to learn the types of host and parasite with examples.
3. The students will be able to learn about the morphology, life cycle, pathogenicity and treatment of common parasites (Protists and Platyhelminthes).
4. The students will be able to learn about host -parasite relationships and their effects on host body.
5. The students will be able to learn about the arthropod parasites and their role as vector

No.	Title & Contents	Number of lectures
1.	Types of parasites Ectoparasites, endoparasites and subtypes. (Definition- Host, Parasite and Vector)	(L-02)
2.	Types of Host Intermediate and definitive; Paratenic and Reservoir	(L-01)
3.	Host-parasite relationship Host specificity-definition, Structural, physiological and ecological specificity.	(L-03)
4.	Study of following parasites <i>Malarial parasite Plasmodium falciparum, Ascaris lumbricoides, Trichinella spiralis, Taenia solium</i> With reference to habit, habitat, life cycle, mode of infection, pathogenicity, control measures and diseases caused.	(L-16)

- 5. Study of following parasites (L-04)**
Head louse, Rat flea, Mite (Scabies)
with reference to morphology, life-cycle, pathogenicity and control measures.
- 6. Parasitological significance of Zoonosis (L-02)**
Bird-flu, Rabies, Japanese encephalitis, Toxoplasmosis
- 7. Study of vectors, disease caused and their control measures (L-08)**
Mosquito, Housefly, Sand fly and Tick.

Reference Books

1. Parasitology: K. D. Chatterjee.
2. Parasitic Helminths: Targets, Screens, Drugs, and Vaccines, 201.
3. Parasitism: The Diversity and Ecology of Animal Parasites (2014) Tim Goater, Timothy M. Goater, Cameron P. and Esch, Gerald W. Cambridge University Press.
4. Principles of Veterinary Parasitology (2016), 1st Edn, Dennis E. Jacobs, Mark Fox, Lynda M. Gibbons, Carols Hermosilla, John Wiley & Sons.
5. Veterinary Parasitology (2013), Hany M. Elsheikha, Jon S. Patterson, CRC Press Taylor & Francis Group
6. Textbook of medical parasitology – C. K. Jayaram Panikar.
7. Textbook of medical parasitology – Arora & Arora.
8. Textbook of medical parasitology – S. C. Parija.
9. Veterinary Parasitology, 2013 - (Taylor, M. A.).
10. Encyclopedia of parasitology, 2008.
11. The Biogeography of Host-Parasite Interactions by Serge Morand, Boris R. Kransov, Oxford University Press.
12. Textbook of medical microbiology – Rajesh Bhatia & Itchpujani

For Practical papers of both semester I and II, 6 practicals should be conducted from each section, minimum 10 practicals (5 each) must be conducted per practical paper

SEMESTER I

Course code and Name: USZOP-113 Zoology Practical-I

Credits-1.5

12 PRACTICALS

(6 practicals based on Animal Diversity-I, 6 practicals based on Parasitology)

Practicals based on Animal Diversity-I (Paper-I)

1. Practical -Museum study of Phylum-Protozoa.

Eg- *Amoeba*, *Euglena*, *Paramoecium* and Study of permanent slides of *Paramoecium* Binary Fission and Conjugation.

2. Practical -*Paramoecium* culture - Study of Cyclosis, Trichocysts, Cilia, Contractile vacuoles, Nuclei.

3. Practical -Museum study of Phylum-Porifera

Eg- *Sycon*, *Leucosolenia*, *Euplectella*, *Hyalonema*, *Chalina*, *Spongilla*.

4. Practical- Study of permanent slides

T.S of *Sycon*, Gemmules and types of spicules.

5. Practical -Museum study of Phylum-Cnidaria

Eg- *Hydra*, *Porpita*, *Vellela*, *Aurelia*, *Metridium*, *Meandrina*.

6. Practical- Study of corals and their economic importance.

Organ-pipe coral, Sea-fan, Stag-horn coral, Star-coral, *Favia* and *Fungia*.

Practicals based on Parasitology (Paper-II)

1. Study of Ectoparasites

a. Rat flea b. Head louse c. Itch mite d. Leech

2. Study of endoparasites (with respect to life-cycle, pathogenicity and control measures).

a. *Plasmodium falciparum*, b. *Ascaris lumbricoides*

3. Study of endoparasites (with respect to life-cycle, pathogenicity and control measures).

a. *Taenia solium*, b. *Trichinella spiralis*

4. Study of Vectors

a. Mosquito b. House fly c. sand fly d. Tick

5. Mouth parts of Vectors

a. Mosquito b. Sand fly c. Housefly d. Head louse

6. Study of gut parasites

Giardia intestinalis, Entamoeba histolytica, Opalina ranarum, Balantidium coli, Nyctotherus, Ascaris eggs

SEMESTER-II

Course code and Name: USZO-121 Animal Diversity-II

Lectures-36

Credits-2

Course Specific Outcome -

1. The student will be able to understand, classify and identify the diversity of animals.
2. The student will understand the importance of classification of animals and classifies them effectively using the six levels of classification.
3. The students will know their role in nature as a protector and conservator of life which they have understood by learning and observing life.

No.	Title & Contents	Number of lectures
	1. Phylum-Platyhelminthes	(L-06)
1.1	Introduction to Phylum Platyhelminthes	
1.2	Salient features of Phylum Platyhelminthes	
1.3	Classification of Phylum Platyhelminthes up to classes with two examples each class (names only) Class: Turbellaria (e.g: <i>Dugesia</i> , <i>Bipalium</i>) Class: Trematoda (e.g: <i>Fasciola hepatica</i> , <i>Schistosoma haematobium</i>) Class: Cestoda: (<i>Taenia solium</i> , <i>Echinococcus granulosus</i>)	
1.4	Parasitic adaptations in Platyhelminthes: structural and physiological.	
1.5	Economic importance of Platyhelminthes- Useful- <i>Dugesia</i> , Harmful-Liverfluke (mode of infection and nature of damage)	
	2. Phylum-Aschelminthes	(L-04)
2.1	Introduction to phylum Aschelminthes	
2.2	Salient features of Phylum Aschelminthes	
2.3	Classification of Phylum Aschelminthes, Class: Nematoda with two examples – <i>Ascaris lumbricoides</i> , <i>Wuchereria bancrofti</i> .	
2.4	Economic importance of Nematoda, Useful and Harmful nematodes ((mode of infection and nature of damage)	
	3. Phylum-Annelida	(L-12)
3.1	Introduction to Phylum Annelida	
3.2	Salient features of Phylum Annelida.	

3.3 Classification of Phylum Annelida up to classes with two examples (names only)

Class: Polychaeta e.g.: *Nereis virens*, *Aphrodita aculeata*

Class: Oligochaeta e.g.: *Pheretima posthuma*, *Tubifex*

Class: Hirudinea e.g.: *Hirudinaria granulosa*, *Pontobdella*

3.4 Type study of Earthworm, *Pheretima posthuma* with respect to Systematic position, External characters, Digestive, Nervous, Circulatory, Respiratory, Excretory and Reproductive system.

3.5 Economic importance of Annelida with reference to earthworms as friends of farmers and their role in vermicomposting.

4. Phylum-Arthropoda

(L-08)

4.1 Introduction to Phylum Arthropoda

4.2 Salient features of Phylum Arthropoda

4.3 Classification of Phylum Arthropoda upto class level with any examples (names only)

Class: Onychophora e.g. *Peripatus*

Class: Crustacea: *Palaemon palaemon*, *Brachyura* sp.

Class: Chilopoda: *Scolopendra* sp.

Class: Diplopoda: *Julus* sp.

Class: Insecta: *Periplaneta americana*, *Anopheles stephensii*.

Class: Arachnida: Signature spider, *Heterometrus* sp.

4.4 Mouth parts of insects: Mandibulate, Piercing and sucking, Chewing and lapping type.

4.5 Economic importance of Arthropoda

Useful Insects: Lac insect

Harmful insects: Rice weevil.

5. Phylum-Mollusca

(L-06)

5.1 Introduction to Phylum Mollusca

5.2 Salient features of Phylum Mollusca

5.3 Classification of Phylum Mollusca with any two examples (names only)

Class: Gastropoda e.g. *Pila globose*, *Patella*

Class: Pelecypoda e.g. *Lamellidens marginalis*, *Mytilus*

Class: Polyplacophora e.g. *Chiton*

Class: Cephalopoda e.g.: *Octopus vulgaris*, *Sepia officinalis*

5.4 Economic importance of Mollusca.

Useful- Pearl oyster, Harmful- Giant African snail.

Reference Books

1. Text Books of Zoology. Vol.11, Invertebrates, 1982, A. J. Marshall And W. D. Williams, ELBS and Macmillan, Hongkong.
2. General Zoology by Goodnight and others IBH Publishing Co.
3. Life of Invertebrates By Prasad,ASN,Vikas Publishing House,New Delhi
4. Phylum Protozoa to Echinodermata (series) By Kotpal, R.L., Rastogi and Co. Meerut
5. Invertebrate zoology By Barnes,Saunders College Publishing Co., Philadelphia, USA,1987
6. Text Books of Zoology, Invertebrates Vol- II, 1992, T.J.Parker and W.A. Haswel, Edited by Marshall and Williams, CBS publications and distribution, New Dehli.
7. Invertebrates Zoology, E.L. Jordon and P.S. Verma; S. Chand and Co. Ltd., New Dehli.14th fully Revised Edition- 2007.
8. Invertebrate Zoology, 1991, Paul, A. Meglitch and Fedricks R. Schram, Oxford University Press, New York.
9. IGCSE Biology, D. G. Mackean, Published by John Murray, London. UK, 2002.
10. Invertebrate Zoology, Edited by D. T. Anderson, Oxford University Press, New York.-Indian Edition by- A.P. Offset, Dehli, 2006.

SEMESTER-II.

Course code and Name: USZO-122 Public Health & Hygiene

Lectures-36

Credits-2

Course Specific Outcome:

1. The student will understand interconnected relationships among physical, social, and environmental aspects of health and disease.
2. Appreciate the role of multiple determinants of health across diverse populations and health issues.
3. Understand and communicate using public health terminology, including epidemiological measures.
4. Interpret quantitative and qualitative information about population health.
5. Synthesize information from a variety of sources to understand and act upon population health problems.

No.	Title & Contents	Number of lectures
1.	Communicable diseases-Epidemic diseases	(L-12)
	A. Water borne diseases	
	a. Cholera b. Typhoid c. Hepatitis-A	
	B. Air borne diseases	
	a. Tuberculosis b. Pneumonia	
	C. Vector borne diseases	
	a. Malaria b. Kala azar c. Dengue, d. Chicken gunia	
2.	Pandemic diseases	(L-04)
	a. Covid-19	
	b. Bubonic Plague	
3.	Non communicable diseases	(L-02)
	a. Diabetes	
	b. Rheumatic heart disease	
	c. Thalassemia	
4.	Pets and Zoonotic diseases	(L-02)
	a. Mites	
	b. Bird lice	
	c. Allergic reaction (Bronchial Asthama)	

- d. Ticks
- e. Flea

5. Preventive and Control Measures (L-02)

- a. Vaccine types-Live attenuated virus vaccines, m-RNA vaccines, Recombinant DNA vaccine
- b. Antisera- anti-snake venom and anti-rabies

6. Study of Addiction and its social implications (L-04)

- a. Alcohol
- b. Drug
- c. Tobacco
- d. Digital addiction

7. Social Industrial Hygiene (L-06)

7.1 Occupational diseases

7.2 Accidents and Risks

- a. Industrial hazards
- b. Laboratory hazards
- c. Domestic hazards (microwave)
- d. Radiation hazards (mobile towers)
- e. Pesticide hazards

7.3 Public safety measures during epidemics & pandemics

- a. Life saving techniques- CPR, burns and wounds
- b. Personal and public hygiene practices during epidemics & pandemics.

8. Food adulteration (L-04)

- a. Preservatives
- b. Colors
- c. Additives
- d. Unintentional exposure to adulteration
- e. Regulatory authorities to control food adulteration

Reference Books

1. A text book of preventive and social medicine 2011, 21st Edn. Park. K., Banarsidas Bhanot Publishers, Jabalpur, India
2. Preventive and social medicine in India, 2013, 4th Edn. B. K. Mahajan, M. C. Gupta, Jaypee Brothers Medical Publishers, New Delhi, India
3. Medical Zoology and Medical Technology. R.C. Sobti, Shobanlal and Co., Jalandhar
4. Review in community medicine, 2006, 2nd Edn. V. V. R. Seshu Babu, Paras Medical Books Pvt. Ltd., Hyderabad.

SEMESTER-II

Course code and Name: USZOP-123 Zoology Practical-II

CREDITS-1.5

12 PRACTICALS

(6 practicals based on Animal Diversity-II, 6 practicals based on Public Health and Hygiene)

Practicals based on Animal Diversity-II

1. Practical 1- Museum study of :
Phylum-Platyhelminthes e.g. Planaria, Liver-fluke (Add life cycle slides), Tapeworm and study of permanent slides-Scolex and mature proglottid.
2. Practical 2- Museum study of
 - a. Phylum-Aschelminthes,
e.g. - *Ascaris lumbricoides*, *Wuchereria bancrofti*, and
 - b. Phylum-Annelida,
e.g. - *Nereis*, *Aphrodite*, Leech
3. Practical 3- Museum study of
Phylum-Arthropoda e.g. - *Peripatus*, Prawn, *Julus*, *Scolopendra*, Praying mantis, Scorpion
4. Practical 4- Use of identification key to identify insects – specimens from orders -
Diptera, Orthoptera, Lepidoptera, Coleoptera
5. Practical 5- Museum study of
Phylum-Mollusca e.g. Bivalve, *Chiton*, *Dentalium*, *Octopus*, *Pila*.
6. Practical 6-Dissection of Earthworm
External characters, Digestive system and mounting of setae.

Practicals based on Public health Hygiene

1. Food adulteration-Laboratory test of minimum 5 food items.
2. Pests of pets
 - a. Dog tick
 - b. Bird louse

- c. Bird mite
- d. Cat flea
- 3. Methods of water purification and visit to water purification plant
- 4. Survey with the help of questionnaire in 10 families.
 - a. Communicable diseases b. Vaccines
- 5. Survey of occupational hazards in 10 families with the help of Questionnaire.
- 6. Visit to Government food testing laboratory.