(Information to be uploaded in Standard Proforma's)

Academic:

1. Degree Offered –UG, PG, PhD

Title of degree: Veterinary Parasitology

Duration:2 Years (M.V.Sc), 3 Years (Regular Ph.D), 4 Years (In-service Ph.D)

Eligibility Criteria: BVSc& A.H/M.V.Sc (Veterinary Parasitology)

Intake Capacity: 3

Opportunities:

After parasitologist there are multiple Opportunities viz government sector as Livestock Development Officer , Veterinarians, Academicians ,In research institute, medical colleges, animal house incharge of science colleges and private research industry, Phrama industry etc.

2. Academic Regulations:

UG , PG, PhD (VCI, ICAR, IV, V Dean's and Corrigendum) – PDF Copies

3. Admissions:

UG, PG, PhD

List of Admitted Students – First Year to Final Year (Veterinary Year wise / Fishery and Dairy Semester wise) :

1. MVSc.

Sr. No.	Name of Student	Enrl. No.	Email Address	Name of Advisor
1	Mr. Kurude Akash Shivajirao	V/17/175	akashkurude3186@gmail.com	Dr. H. Y. Palampalle
2	Mr. Khonde Siddheshwar Kant	V/18/191	Khondes1999@gmail.com	Dr. R. P. Naringrekar
3	Mr. Khan Shahreyar Athar Karam Hussain	V/18/184	Khanshahreyar18@gmail.com	Dr.J.G.Gudewar
4.	Mr.Wagh Jaydeep Babasaheb	V/19/384	jaydeepwaghvet@gmail.com	Dr. H. Y. Palampalle
5.	Kakati Pooja	--	P898kakati@gmail.com	Dr. H. Y. Palampalle
6.	Mr. Mihir Shankar Virkar	--	mihirvirkar317@gmail.com	Dr. H. Y. Palampalle
2. In-service Ph.D				
1	Dr Riddhi Prabhakar Pednekar	V/02/1345	riddhipednekar@mafsu.ac.in	Dr.J.G.Gudewar

4. Course offered :: UG, PG , PhD – Semester / Year wise

- List of UG Courses (B.V.Sc & AH) As per latest MSVE Guidelines) , B.Tech. (D.T.) and B.F.Sc as per ICAR – V Deans Committee – 2016.

Sr No	Course No.	Title	Credit	Course offered in the Year
1.	VPA I & II	Veterinary Parasitology	3+2	III Year B.V.Sc & A.H

- List of PG Courses (MVSc) and M.Tech. (Dairy Technology)

Sr No	Course No .	Title	Credit	Semester
1	VPA 501	Platyhelminthes-I	1+1	I
2	VPA 502	Platyhelminthes-II	1+1	I
3	VPA 503	Nemathelminthes and Acanthocephala	2+1	I
4	VPA 504	Arthropod Parasite	2+1	II
5	VPA 505	Parasitic Protozoa	2+1	II
6	VPA 506	Diagnostic Parasitology	0+2	I
7	VPA 507	Clinical Parasitology	1+1	II
8	VPA 508	Management of Parasitic Diseases	1+1	II

9	VPA 509	Immunoparasitology	2+1	II
10	VPA 510	Parasitic Zoonoses	2+0	II
11	VPA 511	Parasites of Wildlife	1+1	II
12	VPA 591	Master's Seminar	1+0	III
13	VPA 599	Master Research	0+30	III & IV

5. Lecture Schedule – UG, PG , PhD - Theory / Practical Schedule – Approved by BoS – Subject wise

Course Contents M.V.Sc. in Veterinary Parasitology

Course Title : Platyhelminthes-I Course Code : VPA 501 Credit Hours : 1+1

Theory

Unit I Introduction, classification, general account and economic importance of trematodes.

Unit II Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, Treatment and control measures of trematodes belonging to families: Dicrocoeliidae, Opisthorchiidae and Fasciolidae.

Unit III Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment and control measures of trematodes belonging to families: Echinostomatidae, Heterophyidae, Plagiorchiidae, Troglotrematidae, Prosthogonimidae, Nanophyetidae and Paragonimidae.

Unit IV Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment and control measures of trematodes belonging to families: Notocotylidae, Brachylemidae, Cyclocoelidae, Paramphistomatidae and Schistosomatidae.

Unit V Classification, characters of snails and control strategies of molluscs of veterinary importance.

Practical

• Collection, preservation/ processing and identification of trematode parasites; their eggs and intermediate hosts.

• Observation on parasitic stages in host tissues and associated pathological lesions.

• Identification of molluscs of veterinary importance and examination of molluscs for various developmental stages of trematode parasites.

Course Title : Platyhelminthes-II Course Code : VPA 502 . Credit Hours : 1+1

Aim of the course To study the morphology, biology, pathogenesis and control measures for cestode Veterinary Para-Clinical Subjects: Veterinary Parasitology 485 parasites of veterinary importance.

Unit I Introduction, classification, general account and economic importance of cestodes

Unit II Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment and control measures of cestodes belonging to families: Diphyllobothriidae, Mesocestoididae and Taeniidae.

Unit III Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment and control measures of cestodes belonging to families: Davaineidae, Hymenolepididae, Dipylidiidae and Dilepididae. Unit IV Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, Treatment and control measures of cestodes belonging to families: Anoplocephalidae and Thysanosomidae.

Practical

Collection, preservation/ processing and identification of cestode parasites; their eggs, larval stages and intermediate hosts. Parasitic stages in host tissues and associated pathological lesions.

Course Title : Nemathelminthes and Acanthocephala Course Code : VPA 503 Credit Hours : 2+1

Aim of the course To study the morphology, biology, pathogenesis, diagnosis and control of nematodes and thorny-headed worms of veterinary importance.

Theory

Unit I Introduction, classification, general account and economic importance of nematodes and thorny-headed worms.

Unit II Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment and control measures of nematodes belonging to families: Ascarididae, Anisakidae, Oxyuridae, Heterakidae and Subuluridae.

Unit III Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment, and control measures of nematodes belonging to families: Rhabditidae, Strongyloididae and Strongylidae.

Unit IV Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment, and control measures of nematodes belonging to families: Trichonematidae, Amidostomidae, Stephanuridae, Syngamidae and Ancylostomatidae.

Unit V Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment and control measures of nematodes belonging to families: Filaroididae, Trichostrongylidae, Ollulanidae, Dictyocaulidae and Metastrongylidae.

Unit VI Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment and control measures of nematodes belonging to families: Spiruridae, Thelaziidae, Acuariidae, Tetrameridae, Physalopteridae, Gnathostomatidae, Filariidae, Setariidae, Onchocercidae and Dracunculidae.

Unit VII Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment and control measures of nematodes belonging to families: Trichinellidae, Trichuridae, Capillariidae and Dioctophymatidae.

Unit VIII Morphology, Epidemiology, Life cycle, Pathogenesis, Clinical signs, Diagnosis, treatment and control measures of thorny headed worms belonging to families: Polymorphidae, Oligacanthorhynchidae and Gnathobdellidae.

Practical

Collection, preservation/ processing and identification of nematode parasites and thorny headed worms; their eggs and larvae and associated pathological lesions.

Course Title : Arthropod Parasites Course Code : VPA 504 Credit Hours : 2+1

Aim of the course To study the morphology, biology, vector potential of the arthropods of veterinary importance and their control measures

Theory

Unit I Introduction, Classification, Harmful effects and Economic importance of arthropod parasites.

Unit II Distribution, Morphology, Life cycle, Seasonal pattern, Pathogenesis, Vector potentiality, Economic significance and control of

arthropods belonging to the families: Culicidae, Ceratopogonidae, Simuliidae and Psychodidae.

Unit III Distribution, Morphology, Life cycle, Seasonal pattern, Pathogenesis, Vector potentiality, Economic significance and control of arthropods belonging to the families: Tabanidae, Gasterophilidae, Muscidae, Cuterebridae and Glossinidae.

Unit IV Distribution, Morphology, Life cycle, Seasonal pattern, Pathogenesis, Vector potentiality, Economic significance and control of arthropods belonging to the families: Oestridae, Sarcophagidae, Calliphoridae and Hippoboscidae. Importance Veterinary Para-Clinical Subjects: Veterinary Parasitology 487 of blow flies in forensic entomology and treatment of wounds.

Unit V Distribution, Morphology, Life cycle, Seasonal pattern, Pathogenesis, Economic significance and control of arthropods belonging to the families: Pediculidae, Haematopinidae, Linognathidae, Menoponidae, Philopteridae and Trichodectidae.

Unit VI Distribution, Morphology, Life cycle, Seasonal pattern, Pathogenesis, Economic significance and control of arthropods belonging to the Orders- Siphonaptera and Hemiptera, Cimicidae and Reduviidae.

Unit VII Distribution, Life cycle, Seasonal pattern, Vector potentiality, Pathogenesis economic significance and control of acarines belonging to the families: Argasidae and Ixodidae.

Unit VIII Distribution, Morphology, Life cycle, Seasonal pattern, Pathogenesis, Economic significance and control of acarines belonging to the families: Sarcoptidae, Psoroptidae, Demodicidae, Trombiculidae, Dermanyssidae. Cytoditidae and Linguatulidae.

Unit IX Chemical, Biological, Immunological control measures and integrated pest management. Detection and mechanisms of acaricidal resistance.

Practical

Collection, preservation/ processing, identification, differentiation of arthropod parasites and their developmental stages; associated lesions and skin scraping examination.

Course Title : Parasitic Protozoa Course Code : VPA 505 Credit Hours : 2 + 1

Aim of the course To study the morphology, Life cycle, Pathogenesis, Diagnosis and control of protozoan parasites of veterinary importance.

Theory

Unit I Introduction, classification, general account and economic importance of protozoan parasites.

Unit II Morphology, Epidemiology, Pathogenesis, Clinical signs, Diagnosis, and control measures of protozoan parasites belonging to the families: Trypanosomatidae, Monocercomonadidae, Trichomonadidae, Hexamitidae and Endamoebidae.

Unit III Morphology, Epidemiology, Pathogenesis, Clinical signs, Diagnosis and control measures of protozoan parasites belonging to the families: Eimeriidae, Cryptosporidiidae and Sarcocystidae. Restructured and Revised Syllabi of Post-graduate Programmes Vol. 3 488

Unit IV Morphology, Epidemiology, Pathogenesis, Clinical signs, Diagnosis, Treatment and control measures of protozoan parasites belonging to the families: Plasmodiidae, Babesiidae, Theileriidae, Haemogregarinidae and Balantidiidae.

Unit V Morphology, Epidemiology, Pathogenesis, Clinical signs, Diagnosis and control measures of Rickettsiales in relation to haemoprotozoans.

Practical

Collection, Preservation/ Processing, Identification of parasitic protozoa in clinical material and host tissues. Special techniques for certain protozoans such as coccidia and Cryptosporidia.

Course Title : Diagnostic Parasitology Course Code : VPA 506 Credit Hours : 0+2

Practical

Microscopy and micrometry, Preparation of Romanowsky stains. Collection, preservation, Processing and examination of faecal and blood samples; Lymph node biopsy, Skin scrapings, Nasal washings, Sputum, genital discharges/ washings and urine samples from animals for parasitological examinations. Quantitative faecal examination,

Maintenance of fly and tick colonies in laboratory for experimental purposes and testing of drugs; tick dissection for vector potential. Collection of aquatic snails from field and their examination for the presence of different parasitic stages. Collection, fixation, staining, whole mounts and identification of parasites. Culturing techniques for important parasites, pasture larval count, worm count and assessment of worm burden. Remote Sensing (RS) and Geographic Information System (GIS) as tools for mapping parasitic diseases.

Course Title : Clinical Parasitology Course Code : VPA 507 Credit Hours : 1+1

Theory

Unit I Collection, preservation and dispatch of clinical material to laboratory for diagnosis

Unit II History, clinical signs, gross and microscopic examination of diagnostic material. Veterinary Para-Clinical Subjects: Veterinary Parasitology

Unit III Animal sub-inoculation technique; blood and lymph node biopsy smear examination; histopathology of affected organs.

Practical Identification, observation of parasitic stages in host tissues, excretions, secretions and associated pathological lesions. Special techniques for haemoparasites and coccidians.

Course Title : Management of Parasitic Diseases Course Code : VPA 508 Credit Hours : 1+1

Theory

Unit I Conventional and novel methods for control of helminth infections in livestock – anthelmintics, their mode of action, characteristic of an ideal anthelmintic drug, Anthelmintic resistance, Spectrum of activity, Delivery devices and integrated control method. Immunological control, Deworming schedule, Snail and other intermediate host control. Ethno veterinary practices.

Unit II Conventional and novel methods of control of protozoan parasites–antiprotozoal drugs, Their mode of action, Integrated control method including immunological control.

Unit III Conventional and novel methods of control with insecticides/ acaricides. Methods of application, their mode of action, insecticide resistance, biological control, integrated control method, genetic control and immunological control.

Practical In vivo and in-vitro detection of efficacy of control agents and resistance to anthelmintics, anticoccidials, insecticides and acaricides.

Course Title : Immunoparasitology Course Code : VPA 509 Credit Hours : 2+1

Theory

Unit I Introduction, types of parasite-specific antigens and their characterization. Unit II Types of immunity in parasitic infections.

Unit III Invasive and evasive mechanisms, immunomodulators and their uses.

Unit IV Immune responses in helminths, arthropods and protozoa of veterinary importance.

Unit V Immunological control against parasitic diseases.

Practical

Preparation of various antigens (somatic, excretory-secretory) and their fractionation and characterization and demonstration of various immunodiagnostic methods for the diagnosis of parasitic infections

Course Title : Parasitic Zoonoses Course Code : VPA 510 Credit Hours : 2+0

Theory

Unit I Introduction to the concept of Zoonotic infections, Definitions, Various classifications of zoonoses, Host-parasite relationships, Modes of infections and factors influencing prevalence of zoonoses.

Unit II A detailed study of Transmission, Epidemiology, Diagnosis and Control of common protozoa of zoonotic importance.

Unit III A detailed study of Transmission, Epidemiology, Diagnosis and Control of common helminths of zoonotic importance.

Unit IV A detailed study of Transmission, Epidemiology, Diagnosis and Control of common arthropods of zoonotic importance.

Course Title : Parasites of Wildlife Course Code : VPA 511 Credit Hours : 1+1

Theory

Unit I

A detailed study of protozoa of zoo and wild animals with particular emphasis on Veterinary Para-Clinical Subjects: Veterinary Parasitology 491 morphological features, Geographical distribution Epidemiology, Diagnosis and management.

Unit II

A detailed study of arthropod parasites of zoo and wild animals with particular emphasis on morphological features, Geographical distribution, Epidemiology, diagnosis and management.

Unit III

A detailed study of helminth parasites of zoo and wild animals with particular emphasis on morphological features, Geographical distribution, Epidemiology, diagnosis and management.

Practical

Methods for investigating parasitic diseases of captive and wild animals. Collection and identification of parasites. Visits to zoos and biological parks/ sanctuaries for collection of samples.

Course Title : Platyhelminthes-I Course Code : VPA 501 Credit Hours : 1+1

Theory

1-2 Introduction, history, classification, general account and economic importance of trematodes

3-4 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of trematodes belonging to families: Dicrocoeliidae and Opisthorchiidae

5-6 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of trematodes belonging to families: Strigeidae and Fasciolidae

7-8 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of trematodes belonging to families: Echinostomatidae, Heterophyidae, Plagiorchiidae and Troglotrematidae

9-10 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of trematodes belonging to families: Prosthogonimidae, Nanophyetidae and Paragonimidae

11-12 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of trematodes belonging to families: Notocotylidae, Brachylemidae, and Paramphistomatidae

13-14 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of trematodes belonging to families: Cyclocoelidae and Schistosomatidae

15-16 Classification and characters of snails and Control strategies of molluscs of veterinary importance

Practicals

1-5 Collection, preservation/ processing and identification of trematode parasites; their eggs and intermediate hosts

6-11 Observation on parasitic stages in host tissues and associated pathological lesions caused by trematodes

12-16 Identification of molluscs of veterinary importance and examination of molluscs for various developmental stages of trematode parasites.

Course Title : Platyhelminthes-II Course Code : VPA 502 Credit Hours : 1+1

Topic Theory

1-2 Introduction, history, classification, general account and economic importance of cestodes

3-4 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of cestodes belonging to family: Diphyllobothriidae

5 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of cestodes belonging to family: Mesocestoididae

6-8 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of cestodes belonging to family: Taeniidae

9-10 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of cestodes belonging to families: Davaineidae and Hymenolepididae

11-12 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of cestodes belonging to families: Dipylidiidae and Dilepididae

13-14 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of cestodes belonging to family: Anoplocephalidae

15-16 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of cestodes belonging to family: Thysanosomidae

Practicals

1-8 Collection, preservation/ processing and identification of cestode parasites; their eggs, larval stages and intermediate hosts.

9-16 Observation on parasitic stages in host tissues and associated pathological lesions

Course Title : Nemathelminthes and Acanthocephala Course Code : VPA 503 Credit Hours : 2+1

Lecture Topic

1-2 Introduction, history, classification, general account and economic importance of nematodes and thorny-headed worms

2-4 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to family: Ascarididae

5-6 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Anisakidae and Oxyuridae

7-8 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Heterakidae and Subuluridae

9-10 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Rhabditidae and Strongyloididae

11-12 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to family: Strongylidae.

13-14 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Trichonematidae and Amidostomidae

15-16 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Stephanuridae and Syngamidae

17-18 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to family: Ancylostomatidae.

19-20 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Filaroididae and Trichostrongylidae

21-22 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Ollulanidae, Dictyocaulidae and Metastrongylidae

23-24 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Spiruridae, Thelaziidae, Acuariidae, Tetrameridae, Physalopteridae, and Gnathostomatidae

25-26 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Filariidae, Setariidae, Onchocercidae and Dracunculidae.

27-28 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Trichinellidae and Trichuridae

29-30 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Capillariidae and Dioctophymatidae

31-32 Morphology, epidemiology, life cycle, pathogenesis, clinical signs, diagnosis and control measures of nematodes belonging to families: Polymorphidae, Oligacanthorhynchidae and Gnathobdellidae.

Practicals

1-16 Collection, preservation/ processing and identification of nematode parasites and thorny headed worms; their eggs and larvae and associated pathological lesions.

Course Title : Arthropod Parasites Course Code : VPA 504 Credit Hours : 2 + 1

Topic

1-2 Introduction, classification harmful effects and economic importance of arthropod parasites

3-4 Distribution, morphology, life cycle, seasonal pattern, pathogenesis, vector potential, economic significance and control of arthropods belonging to the family: Culicidae

5-6 Distribution, morphology, life cycle, seasonal pattern, pathogenesis, vector potential, economic significance and control of arthropods belonging to the family: Ceratopogonidae

7-8 Distribution, morphology, life cycle, seasonal pattern, pathogenesis, vector potential, economic significance and control of arthropods belonging to the families: Simuliidae and Psychodidae.

8-9 Distribution, morphology, life cycle, seasonal pattern, pathogenesis, vector potential, economic significance and control of arthropods belonging to the families: Tabanidae and Gasterophilidae

10-11 Distribution, morphology, life cycle, seasonal pattern, pathogenesis, vector potential, economic significance and control of arthropods belonging to the families: Muscidae, and Glossinidae

12-14 Distribution, morphology, life cycle, seasonal pattern, pathogenesis, vector potential, economic significance and control of arthropods belonging to the families: Oestridae, Sarcophagidae, Calliphoridae and Hippoboscidae. Importance of blow flies in forensic entomology and treatment of wounds

15-18 Distribution, morphology, life cycle, seasonal pattern, pathogenesis, economic significance and control of arthropods belonging to the families: Pediculidae, Haematopinidae, Linognathidae, Menoponidae, Philopteridae and Trichodectidae

19-20 Distribution, morphology, life cycle, seasonal pattern, pathogenesis, economic significance and control of arthropods belonging to the order: Siphonaptera and families: Cimicidae and Reduviidae

21-25 Distribution, morphology, life cycle, seasonal pattern, pathogenesis, vector potential, economic significance and control of arthropods belonging to the families: Argasidae and Ixodidae

26-30 Distribution, morphology, life cycle, seasonal pattern, pathogenesis, economic significance and control of acarines belonging

to the families: Sarcoptidae, Psoroptidae, Demodicidae, Trombiculidae, Dermanyssidae. Cytoditidae and Linguatulidae.

31-32 Chemical, biological, immunological control measures and integrated pest management. Detection and mechanisms of acaricidal resistance

Practicals

1-16 Collection, preservation/ processing, identification, differentiation of arthropod parasites and their developmental stages; associated lesions and skin scraping examination

Course Title : Parasitic Protozoa Course Code : VPA 505 Credit Hours : 2+1

Lecture Theory

1-3 Introduction, History, Classification and General account and economic importance of protozoan parasites Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Trypanosomatidae

8-10 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Monocercomonadidae and Trichomonadidae

11-12 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Hexamitidae and Endamoebidae

13-14 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Endamoebidae

15-16 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Eimeriidae.

17-18 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Cryptosporidiidae.

19-22 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Sarcocystidae.

23 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Plasmodiidae.

24-26 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Babesiidae.

27-28 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Theileriidae.

29-30 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites belonging to the family Haemogregarinidaeand Balantidiidae

31-32 Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of Rickettsiales like Anaplasma, Ehrlichia, Haemobartonella and others.

Practicals

1-4 Collection, preservation/ processing, identification of protozoan parasites based on faecal examination.

5-8 Collection, preservation/ processing, identification of protozoan parasites based on blood examination.

9-12 Observations on parasite stages in host tissues and the attendant pathological lesions.

13-16 Diagnosis of protozoan parasites of Veterinary importance.

Course Title : Diagnostic Parasitology Course Code : VPA 506 Credit Hours : 0+2

Topic Practical

1-2 Microscopy and micrometry, Preparation of Romanowsky stain.

3-8 Collection, preservation, processing and examination of faecal and blood samples; lymph node biopsy, skin scrapings, nasal washings sputum, genital discharges/ washings and urine samples from animals for parasitological examinations.

9-12 Quantitative faecal examination.

13-16 Maintenance of fly and tick colonies in laboratory for experimental purposes and testing of drugs; tick dissection for vector potential.

17-20 Collection of aquatic snails from field and their examination for the presence of different parasitic stages.

21-24 Collection, fixation, staining, whole mounts and identification of parasites.

25-28 Culturing techniques for important parasites, pasture larval count, worm count and assessment of worm burden.

29-32 Remote Sensing (RS) and Geographic Information System (GIS) as tools for mapping parasitic diseases.

Course Title : Clinical Parasitology Course Code : VPA 507 Credit Hours : 1+1

Lecture Topic Theory

1-3 Unit I: Collection, preservation and dispatch of clinical material to laboratory for diagnosis.

4-8 Unit II: History, clinical signs, gross and microscopic examination of diagnostic material.

9-10 Unit III: Animal sub-inoculation tests.

11-13 Unit III: Blood and biopsy smear examination.

14-16 Unit III: Histopathology of affected organs.

Practical

1-12 Identification, observation of parasitic stages in host tissues, excretions, secretions and associated pathological lesions.

7-12 Special techniques for Cryptosporidium oocysts in faecal samples. Sporulation of coccidial oocysts.

Course Title : Management of Parasitic Diseases Course Code : VPA 508 Credit Hours : 1+1

Lecture Topic Theory

1-6 Unit I: Conventional and novel methods of control of helminth infection in livestock – anthelmintics, their mode of action, characteristic of an ideal anthelmintic drug, anthelmintic resistance, spectrum of activity, delivery devices, integrated control method. Immunological control. Deworming schedule. Snail and other intermediate host control.

7-11 Unit II: Conventional and novel methods of control of protozoan parasites– antiprotozoal drugs, their mode of action, integrated control method including immunological control.

12-16 Unit III Conventional and novel methods of control with insecticides/ acaricides. Methods of application, their mode of action, insecticide resistance, biological control, integrated control method, genetic control and immunological control.

Practical

1-6 In vivo detection of efficacy of and resistance to parasiticidal agents.

7-16 In-vitro detection of efficacy of and resistance to parasiticidal agents

Course Title : Immunoparasitology Course Code : VPA 509 Credit Hours : 2+1

Lecture Topic Theory

1-7 Unit I: Introduction, types of parasite-specific antigens and their characterization. 8-13 Unit II: Types of immunity in parasitic infections.

14-18 Unit III: Invasive and evasive mechanisms, immunomodulators and their uses. 19-27 Unit IV: Immune responses in helminths, arthropods and protozoa of veterinary importance.

28-32 Unit V: Immunological control against parasitic diseases

Practical

1-9 Preparation of various antigens (somatic, excretory-secretory) and their fractionation and characterization

10-16 Demonstration of various immunodiagnostic methods for the diagnosis of parasitic infections

Course Title : Parasitic Zoonoses Course Code : VPA 510 Credit Hours : 2+0

Lecture Topic Theory

1-3 Unit I: Introduction to the concept of zoonotic infections

4-6 Unit I:Definition and various classifications of zoonoses.

7-10 Unit I: Host-parasite relationships, modes of infections, factors influencing prevalence of zoonoses.

11-18 Unit II: A detailed study of transmission, epidemiology, diagnosis and control of major protozoa of zoonotic importance.

19-25 Unit III: A detailed study of transmission, epidemiology, diagnosis and control of major helminths of zoonotic importance.

26-32 Unit IV: A detailed study of transmission, epidemiology, diagnosis and control of major arthropods of zoonotic importance.

Course Title : Parasites of Wildlife Course Code : VPA 511 Credit Hours : 1+1

Lecture Theory

1-6 Unit I: A detailed study of protozoa of zoo and wild animals with particular emphasis on morphological features, geographical distribution epidemiology, diagnosis and management.

7-12 Unit II: A detailed study of arthropod parasites of zoo and wild animals with particular emphasis on morphological features, geographical distribution, epidemiology, diagnosis and management.

13-16 Unit III: A detailed study of helminth parasites of zoo and wild animals with particular emphasis on morphological features, geographical distribution, epidemiology, diagnosis and management Practical 1-6 Methods for investigating parasitic diseases of captive and wild animals.

7-16 Collection and identification of parasites. Visits to zoos and biological parks/ sanctuaries for collection of samples.

Course Title with Credit Load Ph.D. in Veterinary Parasitology

Course Title : Advances in Helminthology-I Course Code : VPA 601 Credit Hours : 2+1

Theory

Unit I Advanced studies on Taxonomy, Molecular biology, Pathogenesis and Immunology of trematodes and their larval stages.

Unit II Advanced studies on Taxonomy, Molecular biology, Pathogenesis and Immunology of cestodes and larval stages.

Practical

Morphological, Pathological and Immunological studies of trematode and cestode parasites.

Course Title: Advances in Helminthology-II Course Code : VPA 602 Credit Hours : 2+1

Theory

Unit I Advanced studies on Taxonomy, Molecular biology, Pathogenesis and Immunology of nematode parasites and their larval stages.

Unit II Advanced studies on Taxonomy, Molecular biology, Pathogenesis and Immunology of thorny-headed worms.

Practical

Morphological, Pathological and Immunological studies of various nematodes and thorny-headed worms.

Course Title : Entomology and Acarology Course Code : VPA 603 Credit Hours : 2+1

Theory

Unit I Origin, Evolution, Regional/ Seasonal distribution and Forecasting of insect and acarine population.

Unit II Population dynamics of insects and acarines in relation to biotic and abiotic factors

Unit III Recent developments pertaining to insects of veterinary importance.

Unit IV Recent developments pertaining to arachnids of veterinary importance.

Unit V Chemical, Biological, Herbal and Immunological control measures and integrated pest management. Modulation of vector competence to transmit parasitic infections using molecular genetics by developing transgenic vectors.

Practical

Collection and identification of arthropods; Demonstration of the infective stages in vectors. Immuno pathological changes produced in the host tissues due to the infestation of arthropods.

Course Title : Advances in Protozoology Course Code : VPA 604 Credit Hours : 2+1

Theory

Unit I Advanced studies on Taxonomy, Molecular biology, Pathogenesis and Immunology of intestinal protozoa.

Unit II Advanced studies on Taxonomy, Molecular biology, Pathogenesis and Immunology of haemoprotozoans.

Unit III Advanced studies on Taxonomy, Molecular biology, Pathogenesis and Immunology of tissue and other protozoa.

Practical

Morphological, pathological and immunodiagnosis of protozoan diseases

Course Title : Immunology of Parasitic Diseases Course Code : VPA 605 Credit Hours : 1+2

Theory

Unit I To study the salient features of immune responses in relation to trematode, cestode, nematode and protozoan infections in livestock. Immune responses to arthropod infestations.

Unit II Principles and applications of immunodiagnostic methods for parasitic diseases.

Unit III Standardization of immunodiagnostic methods for parasitic diseases.

Unit IV Identification of candidate antigens for diagnosis and vaccine development.

Practical

Methods for purification of antigens, fractionation and characterization of antigens, identification of candidate antigens as drug targets, raising of hyperimmune sera, development and standardization of immunodiagnostic methods for the diagnosis and control of parasitic infections.

Course Title : Molecular Diagnostics and Vaccine Development for Parasitic Diseases Course Code : VPA 606 Credit Hours : 2+1

Theory

Unit I Introduction to molecular taxonomy of parasites.

Unit II Genome organisation in parasites of veterinary importance. Structure and function of nucleic acids.

Unit III Basic plan of gene cloning, and expression in heterologous host. Production of recombinant protein and downstream processing for diagnostic/ prophylactic applications.

Unit IV General concept of protein synthesis. Identification and molecular characterization of proteins of diagnostic/ prophylactic relevance of parasitic origin. Unit V Nucleic acid based techniques for genetic characterization and sensitive diagnosis of parasitic infections; PCR, LAMP, Nucleic acid hybridization technique, pyrosequencing, Real Time PCR, DNA Microarray, Microsatellite analysis, RNAi, Reverse Genetic Approaches and their applications.

Unit VI Hybridoma technology. Principle of production of monoclonal antibody. The diagnostic application of monoclonal antibodies of parasitic infection.

Unit VII DNA vaccine, Vector vaccine, Recombinant protein based vaccine, Subunit vaccine, Principle and Application.

Practical

Identification, Characterization, and Purification of Recombinant Protein Antigens; SDS-PAGE and Western Blotting, Extraction and quantification of nucleic acid and PCR and related techniques

Course Title : Host Parasite Interactions Course Code : VPA 607 Credit Hours : 2+0

Theory

Unit I Introduction, Distribution of parasites on/ in the host, Morphological adaptation for better survival in/ on the host.

Unit II Behavioural defences, Host immune responses and Genetic resistance to parasites.

Unit III Establishment of parasites in immune competent, Susceptible, Intermediate and Abnormal hosts, Chronicity of parasitic infections, Immuno evasive strategies of the parasites and host-parasite equilibrium.

Unit IV Pathological consequences of host parasite interactions in relation to malnutrition and micronutrient metabolism.

Course Title : In-vitro Cultivation of Parasites Course Code : VPA 608 Credit Hours : 1+2

Theory

Unit I Introduction, problems and goals of in-vitro cultivation of parasites.

Unit II In-vitro cultivation of genital, Intestinal flagellates and Intestinal ciliates. Unit III In-vitro cultivation of intestinal protozoa.

Unit IV In-vitro cultivation of haemoprotozoa.

Unit V In-vitro techniques, media and tissue culture for cultivation of helminths and their larval stages.

Unit VI In-vitro mass rearing and colonization of ticks, flies and other insects.

Practical

Preparation of media, sterilization methods and cultivation of different parasites.

Course Title : Emerging and Re-Emerging Parasitic Diseases Course Code : VPA 609 Credit Hours : 2+0

Theory

Unit I Emerging and re-emerging helminthic diseases.

Unit II Emerging and re-emerging protozoan diseases.

Unit III Emerging and re-emerging vector- borne diseases.

Course Title : Biology and Ecology of Parasites Course Code : VPA 610

Credit Hours : 3+0

Theory

Unit I Ultrastructure, Physiology, Biochemistry and Bionomics of trematodes and cestodes of veterinary importance.

Unit II Ultrastructure, Physiology, Biochemistry and Bionomics of nematodes of veterinary importance.

Unit III Ultrastructure, Physiology, Biochemistry and Bionomics of important arthropod parasites.

Unit IV Ultrastructure, Physiology, Biochemistry and Bionomics of important protozoan parasites.

Unit V Ecology related definitions, Environmental changes and ecological disturbances due to natural phenomenon and human interventions (demographic, societal and agricultural changes global warming, floods, hurricanes and pollution. Unit VI Principles of Remote Sensing, GIS and their role in Veterinary Parasitology.

Course Title : Molecular Veterinary Parasitology Course Code : VPA 611 Credit Hours : 2+0

Theory

Unit I Introduction to molecular biology of parasites-Biological molecules (carbohydrate, protein and nucleic acid)- Eukaryotic cell

structure, cell membrane and organelleskinetoplast, apicoplast, cilia, flagella biology-Eukaryotic cell metabolism and cell respiration-Oxidative phosphorylation-anaerobic metabolism in parasites-fatty acid metabolism of parasites-cellular reproduction mendelian genetics in parasites and vectors- Genome of parasites of veterinary importance, genome size- molecular taxonomy-DNA barcoding-phylogenetics.

Unit II Genetic code- Gene expression-Transcription and Translation-post translational modifications- RNA interference in parasites-CRISPR/ Cas9 inparasitesmetagenome-microbiome-transcriptome of parasites-transgenic and para transgenic approach in parasites-drug resistance mechanisms.

Unit III Molecular biology of helminth parasites such as Fasciola spp, Schistosoma spp, Taenia spp, Echinococcus spp, Toxocara spp, Haemonchus spp., Dictyocaulus spp.

Course Title : Parasite Epidemiology Course Code : VPA 612 Credit Hours : 2+0

Theory

Unit I: Introduction to epidemiological concepts Definitions, aims and uses of epidemiological studies, Approaches of epidemiology (descriptive, analytical and experimental), Types of epidemiological studies along with their advantages and disadvantages, Features of parasitic disease epidemiology. Measures of disease frequency: Morbidity and mortality (Rate, Ratio, Proportional rate), Measures of

morbidity (Cumulative incidence, Incidence rate, Attack rate, Prevalence-Point and Period) and mortality (Cumulative Mortality, Mortality rate, Death rate, Age/ Sex/ Breed death rate, Case fatality proportion, Cause specific death rate, etc.). The epidemiological triangle, iceberg concept, endemic stability, herd immunity concept, etc.

Unit II: Methods in epidemiology Cross-sectional, case control and cohort studies. Techniques of epidemiological surveys. Types of sampling- Non-probability sampling (target sampling, choice sampling, etc.), Probability sampling (Random samples, systemic sampling, stratified sampling. cluster sampling, etc.). Sample size calculation for different epidemiological and experimental studies.

Unit III: Advances in Epidemiological techniques Sero-epidemiological methods used in important parasitic disease-Uses and limitations, Properties and Evaluation. Molecular epidemiology- Principles, laboratory methods, Bioinformatics in molecular epidemiology. Serological and molecular epidemiology of important parasites. Remote sensing and geographic information system- Scope and applications in Veterinary Parasitology.

Unit IV: Epidemiology of Important Parasitic Diseases Epidemiological factors affecting distribution and transmission of important parasitic diseases of animals and birds- Agent Factors/ Disease Patterns, Environment and Disease Patterns, Social Factors and Disease Patterns, etc. Parasitic disease monitoring and evaluation, outbreak investigations and surveillance. Forecasting of parasitic diseases

Course Title : Parasite Epidemiology Course Code : VPA 612 Credit Hours : (2+0)

Lecture Topics Theory

1-4 Unit I: Introduction to epidemiological concepts-Definitions, aims and uses of epidemiological studies, approaches of epidemiology (descriptive, analytical and experimental), types of epidemiological studies along with their advantages and disadvantages, features of parasitic disease epidemiology

5-8 Unit I: Introduction to epidemiological concepts- Measures of disease frequency: Morbidity and mortality (Rate, Ratio, Proportional rate), Measures of morbidity (Cumulative incidence, Incidence rate, Attack rate, Prevalence-Point and Period) and mortality (Cumulative Mortality, Mortality rate, Death rate, Age/ Sex/ Breed death rate, Case fatality proportion, Cause specific death rate, etc.). The epidemiological triangle, iceberg concept, endemic stability, herd immunity concept, etc.

9-12 Unit II: Methods in epidemiology Cross-sectional, case control and cohort studies. Techniques of epidemiological surveys Types of sampling- Non-probability sampling (target sampling, choice sampling, etc.), Probability sampling (Random samples, systemic sampling, stratified sampling. cluster sampling, etc.). Sample size calculation for different epidemiological and experimental studies

13-16 Unit II: Methods in epidemiology Epidemiological Measures of Association-Strength of association (Relative risk, odds ratio), Effect of association (Attributable rate), effect/ importance of association

17-20 Unit III: Advances in Epidemiological techniques Sero-epidemiological methods used in important parasitic disease-Uses and limitations, properties and evaluation. Molecular epidemiology- Principles, laboratory methods, bioinformatics in molecular epidemiology

21-24 Unit III: Advances in Epidemiological techniques Serological and molecular epidemiology of important parasites. Remote sensing and geographic information system- Scope and applications in Veterinary Parasitology

25-28 Unit IV: Epidemiology of Important Parasitic Diseases Epidemiological factors affecting distribution and transmission of important parasitic diseases of animals and birds- Agent Factors/ Disease Patterns, Environment and Disease Patterns, Social Factors and Disease Patterns, etc.

29-32 Unit IV: Epidemiology of Important Parasitic Diseases Parasitic disease monitoring and evaluation, outbreak investigations and surveillance Forecasting of parasitic diseases