Scheme of Studies for M. Phil (Parasitology), Department of Pathobiology
Faculty of Veterinary Sciences, Bahauddin Zakariya University, Multan

Mission

Development of human resource capable of
1) Providing education and training in all aspects of parasitic diseases and their vectors
2) Conducting basic and applied researches in parasitic diseases and vector control
3) Providing laboratory services in the diagnosis of parasitic diseases
4) Provide extension services in the planning, implementation and evaluation of parasitic diseases control programs

Course No.	Course Title	Credit hours
PARA-601	Advanced General Parasitology	3(2-2)
PARA-602	Diagnostic Parasitology	3(1-4)
PARA-603	Parasites of Dairy and Meat Animals	3(2-2)
PARA-604	Parasites of Companion Animals	3(2-2)
PARA-605	Wild Life Parasitology	3(2-2)
PARA-606	Avian Parasitology	3(2-2)
PARA-607	Fish Parasitology	3(2-2)
PARA-608	Physiology of Parasites	3(3-0)
PARA-609	Special Problem	1(1-0)
PARA-610	Seminar	1(1-0)
PARA-611	Biotechnology for Parasite Control	3(2-2)
PARA-612	Food and Water borne Parasitic Zoonoses	3(2-2)
PARA-613	Research Methodologies in Parasitology	2(2-0)
	Total Credit hours	**34**

NOTE:

1. For the award of degree for M. Phil Parasitology Research and Thesis carries 6 credit hours.

2. Minimum credit hours of course work should be 24 including minor subjects which shall not exceed one-third.

3. Minimum credit hours for the award of degree shall be 30.

PARA-601 Advanced General Parasitology 3(2-2)

Learning Objectives:
Upon completion of this course, students will be able to:

- demonstrate adequate knowledge and understanding of the scope of Parasitology together with the basic definitions and terminology as well as classification and nomenclature of parasites of Veterinary importance
- demonstrate detailed knowledge and understanding of the biology, life cycles, pathogenesis, diagnosis of parasitic infections in animals
- develop strategies for the control of the vectors and intermediate hosts of parasites

Theory
Important Parasitic diseases of Livestock in local and global scenario; Inventory of local parasites in domestic animals; Advance studies on molecular biology, epidemiology, pathogenesis, serology and control of important parasites in animals and man. Prediction models for the implementation of deworming schedule; Parasite monitoring and control strategies of ecto and endo-parasites; Choice and modes of application or administration of insecticides, acaricides, anthelmintics and antiprotozoals; Parasitic zoonosis; Economic significance of parasites in dairy, meat animals and Poultry; Review of literature.

Practical
Identification of parasites; their eggs and intermediate hosts; differentiation, study of their stages in the tissues and associated pathological lesions; Clinical examination of animals for ecto- and endo-parasites; Diagnosis of parasitic diseases using conventional and modern techniques, Collection of ecto-parasites and endo-parasites; Application of FAMACHA; Autopsy for collection of internal parasites; Hands on training for the preparation of permanent slides.

Suggested Readings:
1. Bowman DD, JR Georgi, 2014. Georgis' Parasitology for Veterinarians. 10th Ed. Penny Rudolph Publisher, USA
2. Elsheikha HM and Naveed AK, 2011. Essentials of Veterinary Parasitology, Caister Academic Press, UK.
3. Heinz M, 2011. Progress in Parasitology; Parasitology Research Monographs. Vol.2. Springer-Verlag Berlin Heidelberg.
4. Zajac A and Conboy G, 2008. Veterinary Clinical Parasitology, 7th Ed. Blackwell Publishers, USA.
5. Mandal SC, 2006. Veterinary Parasitology at a Glance. International Book Distributing Co.UP. India
6. Thomas CC, 2006. General Parasitology. 2nd Ed. Academic Press. Elsevier.
7. Maudlin I, 2004. The Trypanosomiases. Oxford University Press, UK.
8. Mehlhorn H, (Ed). 2001. Encyclopedic Reference of Parasitology: Diseases, Treatment, Therapy. Springer Verlag, UK.
9. Soulsby EJL, 1982. Helminths, Arthropods and Protozoa of Domesticated Animals. English Language Book Society, Baillere Tindall, London
10. Electronic sources – digital libraries, books, journals, etc.

PARA-602 Diagnostic Parasitology 3(1-4)

Learning objectives

Upon completion of the course, students will be able to:

- practice the basic and modern parasitological procedures employed for diagnosis of parasitic diseases and evaluation of antiparasitics
- prepare the research proposals, plan and conduct experiments on different aspects of parasitic diseases

Theory

Introduction; Operation and maintenance of commonly used equipments of Parasitology Lab; Procedures of collection, preservation and transportation of parasitic material; Qualitative and Quantitative Faecal examination; Pseudoparasites and Pitfalls; Factors affecting faecal egg counts; Faecal culture, recovery and storage techniques; Coccidial Oocysts: Isolation and sporulation; Histopathology for the diagnosis of coccidosis; Haematology and biochemistry as a diagnostic aid in parasitic infections; Recovery of larval parasites from soil, tissues and pastures; Examination of vectors for larval forms; Micrometry; Keys for the identification of helminths, insects and arachnids; Mounting of protozoa, nematodes, trematodes, cestodes and insects; Methods of blood examination; Pseudo-Parasites for blood; Collection, preservation and examination of urine; Macroscopic and microscopic sputum examination; Cerebrospinal fluid examination; Skin scrapings examination for ectoparasites; Serological assays for the diagnosis of parasitic diseases; Review of literature through currently available resources on a topic of interest

Practical

Operation of important laboratory equipment; Qualitative and Quantitative fecal examination protocols; Faecal culture and recovery of larvae; Recovery of parasitic larvae from soil, tissue and pasture; Examination of vectors for larval forms; Micrometery; Preservation, staining and preparation of parasite mounts; Histological examination of tissues for parasites. Examination of urine, blood, skin and other body tissues for parasites; Demonstration of various serological techniques in Parasitic diagnosis

Suggested readings

1. Garcia LS and DA Bruckner, 1988. Diagnostic Medical Parasitology. Elsevier Science Publishing Co. Inc., New York, USA
2. Halton JDW, M Behinke and L Marshal, 2001. Practical Exercises in Parasitology. Blackwell Science Publication, Ames, Iowa, USA
3. Hayat CS and M Akhtar, 1999. Parasitic diagnosis. Higher Education Commission, Islamabad, Pakistan
4. Ministry of Agriculture, Food and Fisheries, 1986. Manual of Veterinary Parasitological Laboratory Techniques. Reference Book No. 418, Her Majesty`s Stationery Office, London, UK
5. Garcia LS, 2009. Practical Guide to Diagnostic Parasitology, 2 nd ed., ASM Press, Washington, D.C., USA
6. Electronic sources – digital libraries, books, journals, etc.

PARA-603 Parasites of Dairy and Meat Animals 3(2-2)

Learning Objectives:
Upon completion of this course, students will be able to:

- diagnose different parasitic infections in meat and dairy animals
- treatment and control of parasites in dairy and meat animal at farm and small dairy holders
- design strategic control programs at farm and small holders level

Theory
Inventory of Parasitic diseases of dairy and meat animals; Parasite control strategies for ecto and endo parasites; Seasonal prediction models for the control of parasites; Managemental practices for prevention of parasitic epidemics at farm level; Modes of application and administration of anthelmintic, acaricdes, insecticides and antiprotozoal drugs; Parasitic zoonosis; Economic importance of parasites in dairy and meat animals; Review of literature through currently available resources on a topic of interest

Practical
Diagnosis of parasitic diseases using conventional and modern techniques; Collection of ecto-parasites; Techniques for hemoparasites; Methods for collection, fixation and preservation of Protozoa, Helminthes, and Arthropods; Methods for preservation of permanent mounts and preservation of parasites; Identification of different parasites of dairy and meat animals; Guidelines for chemotherapeutic trials; *In-vitro* culturing techniques for some selected parasites; Field visit.

Suggested Readings:
1. Bowman DD, JR Georgi, 2014. Georgis' Parasitology for Veterinarians. 10th Ed. Penny Rudolph Publisher, USA.
2. Heinz M, 2011. Progress in Parasitology; Parasitology Research Monographs. Vol.2. Springer-Verlag Berlin Heidelberg.
3. Thomas CC, 2006. General Parasitology. 2nd Ed. Academic Press. Elsevier.
4. Iqbal Z, MN Khan and A Jabbar, 2003. An Illustrated Textbook of Veterinary Entomology, ISBN 969-8490-06-1. University of Agriculture Press, Faisalabad-Pakistan.
5. Rathore VS, 2005. Parasitic Zoonoses. Pointer Publishers, Jaipur, India
6. Urquhart GM, J Armour, JL Duncan, AM Dunn and FW Jennings, 2003. Veterinary Parasitology. English Language Book Society, UK.
7. Sterling CR and RD Adam, 2004. The Pathogenic Enteric Protozoa. Kluwer Academic Publishers, USA.
8. Maudlin I, 2004. The Trypanosomiases. Oxford University Press, UK.
9. Mehlhorn H, (Ed). 2001. Encyclopedic Reference of Parasitology: Diseases, Treatment, Therapy. Springer Verlag, UK.
10. Soulsby EJL, 1982. Helminths, Arthropods and Protozoa of Domesticated Animals. English Language Book Society, Baillere Tindall, London
11. Electronic sources – digital libraries, books, journals, etc.

PARA-604 Parasites of Companion Animals 3(2-2)

Learning Objectives:
Upon completion of this course, students will be able to:

- identify the parasites of companion animals
- understand the life cycle, pathology and control of parasites
- control strategies for parasites of companion animals

Theory
Introduction; Types of companion animals; Companion animals as a business venture; Inventory of system wise parasites of companion animals; Interface of wild and domestic and companion animals; Parasites found in blood, tissues and feces of companion animlas; Species, life cycle, pathogenesis, diagnosis, treatment and control of protozoa, helminths and ecto-parasites infesting companion animals; Transboundary parasitic diseases and their control; Role of surveillance in the control of parasitic diseases; Zoonoses associated with companion animals; Review of literature through currently available resources on a topic of interest

Practical
Inventory of endo and ecto-parasites in wild and domestic animals; Collection, preservation and transportation of samples and specimens for mounting and identification of parasites from companion animals; Blood Examination; Skin Examination; Identification of various parasites

Suggested Readings:
1. Heinz M, 2011. Progress in Parasitology; Parasitology Research Monographs. Vol.2. Springer-Verlag Berlin Heidelberg.
2. Richardson DJ, 2010. North American Parasitic Zoonoses. Kluwer Academic Publishers, Norwell, MA, USA.
3. Mandal SC, 2006. Veterinary Parasitology at a Glance. International Book Distributing Co.UP. India.
4. Bowman DD, EA Fogarty and SC Barr, 2005. Parasitology: Diagnosis and Treatment of Common Parasites in Dogs and Cats. Teton New Media, Jackson, WY, USA.
5. Urquhart GM, J Armour, JL Duncan, AM Dunn and FW Jennings, 2003. Veterinary Parasitology. English Language Book Society, UK
6. Soulsby EJL, 1982. Helminths, Arthropods and Protozoa of Domesticated Animals. English Language Book Society, Baillere Tindall, London.
7. Electronic sources – digital libraries, books, journals, etc.

PARA-605 Wild Life Parasitology 3(2-2)

Learning Objectives:
Upon completion of this course, students will be able to:

- identify the parasites of wild animals
- understand the life cycle, pathology and control of parasites
- control strategies for parasites of wild animals

Theory
Introduction; Types of wild animals; System-wise inventory of different parasites in wild animals; Interface of wild and domestic animals; Parasites found in blood, tissues and feces of wild animals; Species, life cycle, pathogenesis, diagnosis, treatment and control of protozoa, helminths and ecto-parasites infesting wild animals; Role of wild animals in the transmission of Transboundary parasitic diseases; Role of wild animals in the epidemiology of various parasitic diseases; Zoonoses associated with wild animals; Review of literature through currently available resources on a topic of interest

Practical
Inventory of endo and ecto-parasites of wild animals; Collection, preservation and transportation of samples and specimens for mounting and identification of parasites from wild animals; Blood Examination; Skin Examination; Identification of various parasites; Field visit.

Suggested Readings:
1. Kleiman DG, KV Thompson and CK Baer, 2010. Wild Mammals in Captivity: Principles and Techniques for Zoo Management. The University of Chicago Press, Chicago, USA
2. Samuel WM, MJ Pybus and AA Kocan (Eds.), 2001. Parasitic Diseases of Wild Mammals, Iowa State University Press, Iowa, USA
3. Richardson DJ, 2010. North American Parasitic Zoonoses. Kluwer Academic Publishers, Norwell, MA, USA.
4. Mandal SC, 2006. Veterinary Parasitology at a Glance. International Book Distributing Co.UP. India.
5. Bowman DD, EA Fogarty and SC Barr, 2005. Parasitology: Diagnosis and Treatment of Common Parasites in Dogs and Cats. Teton New Media, Jackson, WY, USA.
6. Urquhart GM, J Armour, JL Duncan, AM Dunn and FW Jennings, 2003. Veterinary Parasitology. English Language Book Society, UK
7. Soulsby EJL, 1982. Helminths, Arthropods and Protozoa of Domesticated Animals. English Language Book Society, Baillere Tindall, London.
8. Electronic sources – digital libraries, books, journals, etc.

PARA-606 Avian Parasitology 3(2-2)

Learning Objectives:

Upon completion of this course, students will be able to:

- know the basics of poultry parasites (identification, life cycle, pathogenesis)
- diagnose and treat the parasitic diseases of poultry
- know the conceptual and laboratory aspects of research about poultry parasites

Theory

Introduction to poultry farming systems (Chicken, Quails, Ducks, Ostriches, Pigeons); Parasitic diseases of poultry including nematodes of digestive system and other organs and tissues, trematodes, cestodes, protozoa and arthropods. Parasitological examination of birds. Parasite control program for domestic and commercial layers, broilers and breeders; Parasites of pet and fancy birds. General control and prevention of parasitic diseases in poultry; Commercial and experimental vaccines against parasitic diseases; Emerging parasitic problems of poultry; Economic significance of parasitic diseases in poultry; Review of literature on the poultry parasites.

Practical

Clinical parasitological examination of birds; Faecal examination and identification of various parasites; Diagnosis of haemoparasites and ectoparasites; Post-mortem examination of birds; In-vitro sporulation of coccidial oocysts; Antiparastic drugs; Control of parasitic diseases according to guidelines of WVAAP; Epidemiological disease investigation at flock or population level

Suggested Readings:

1. Bowman DD and JR Georgi, 2014. Georgis' Parasitology for Veterinarians, 10th Ed., Penny Rudolph Publisher, USA.
2. Heinz M, 2011. Progress in Parasitology; Parasitology Research Monographs. Vol. 2. Springer- Vertag Berlin.
3. Atkinson CT, NJ Thomas and DB Hunter, 2008. Parasitic Diseases of Wild Birds. John Wiley and Sons Inc. Ames, Iowa, USA.
4. Saif YM, HJ Barnes, JR Glisson, AM Fadly, LR McDougald and DE Swayne, (Eds.), 2003. Diseases of Poultry, 11th Ed., Iowa State University Press, Ames / Mosby-Wolfe, London.
5. Soulsby EJL, 1982. Helminths, Arthropods and Protozoa of Domesticated Animals, 7th Ed. The English Language Book Society and Bailliere Tindall, London
6. Electronic sources – digital libraries, books, journals, etc.

PARA-607 Fish Parasitology 3(2-2)

Learning Objectives:
Upon completion of this course, students will be able to:

- understand the life cycle, pathogenesis and control of fish parasites
- diagnose and treat parasitic diseases of fish
- attain basic knowledge of epidemiology of parasitic diseases of fish

Theory
Introduction and Classification of fish parasites; Parasite species in the environment (freshwater, brackish water, marine): their location in or on its host(s), the species of host(s) infected, the known geographic distribution; Inventory of Fish end- and ecto-parasites; Morphology, life cycle, pathogenesis, diagnosis, control and treatment of the following Protozoa (Trichodinia, Cryptocaryon, Brooklynella, Henneguya, Amyloodinium, Sphaerospora, Microsporidian, Ichthyophthirius, , Ichthyobodo, Ichthyobodo, Tetrahymena, Heteropolaria, Glossatella, Eimeria, Hexamita, Chilodonella, Amyloodinium, Uronema, etc.); Helminths **(**Benedenia, Neobenedenia, Pseudorhahdosynochus, Diplectenum, Haliotrema, Heterobothrium, Heteraxine, Microcotyle, Bivagina, Choricotyle, Dactylogyrus, Gyrodactylus, Diplostomum, Posthodiplostomum, Cruoricola, Pearsonellum, Cardicola, Paradeontacylix, Proteocephalus, Ligula, etc.); Crustaceans **(**Lepeophtheirus, Caligus, Pseudocaligus, Lernanthropus, Argulus, Rhexanella, Nerocila, etc.); Leeches (Zeylanicobdella, etc.); Myxozoa **(**Myxobolus, Aurantiactinomyxon, Henneguya, etc.); and Acanthocephala (Pomphorhynchus, Acanthocephalus and other important emerging parasites of fish including Turbellarians, Laerhnea, and Anisakis)

Practical
Methods for collection, fixation and preservation of Protozoa, Helminthes, and Arthropods from fish; Methods for preservation of permanent mounts and preservation of parasites; Postmortem/ Dissection of fish to collect the endoparasites of fish; Identification of different parasites of fish,

Suggested Readings:
1. Noga JE, 2010. Fish Disease: Diagnosis and Treatment. 2nd Edition, Wilay- Blackwell (ISBN: 978-0-8138-0697-6).
2. Moeller RB, 1996. Diseases of Fish. Armed Forces Institute of Pathology, Washington DC, USA.
3. Nagasawa K and ER Cruz-Lacierda, 2004. Diseases of Cultured Groupers. Southeast Asian Fisheries Development Center, Aquaculture Department, Iloilo, Philippines.
4. Soulsby EJL, 2005. Helminths, Arthropods and Protozoa of Domesticated Animals, 7th Ed., The English Language Book Society and Bailliere Tindall, London
5. Woo PTK, 2006. Fish Diseases and Disorders: Protozoan and Metazoan infections. Vol. 1, 2nd Ed., CAB International, UK
6. Electronic sources – digital libraries, books, journals, etc.

PARA-608 Physiology of Parasites 3(3-0)

Learning Objectives:

Upon completion of this course, students will be able to:

- have an in-depth understanding of comparative anatomy and physiology of various systems of parasites, behavior of parasites during feeding and reproduction
- attain sufficient knowledge of physiology of parasites and its application for parasite control
- understand the physiological mechanisms of parasite transmission and settlement in hosts

Theory

Introduction; Historical perspective on the evolutionary process of Parasites, Morphology and anatomy of different classes of parasites, Surface Coat, Tegument and Peritrophic membranes of Parasites. Digestive excretory, Nervous and reproductive systems in different classes of parasites. Feeding and nutritional physiology of protozoa, helminths and arthropods. Surface enzymes of parasites. Inhibition of host enzymes by ecto- and endo-parasites. Aerobic and anaerobic metabolic pathways in parasites. Mechanisms of parasite transmission. Establishment, Migration and growth of inhibiting factors. Sensory structures of parasites; Behavioral coordination; Host parasite interaction. Reproductive physiology of parasites. Hormones and Pheromones of parasites. Review of literature through currently available resources on a topic of interest.

Suggested Readings:

1. Roberts LS and JJ Janovy, 2005. Foundations of Parasitology, 7th Ed., The McGraw Hill Companies, Boston, USA
2. Wall R and D Shearer, 1997. Veterinary Ectoparasites: Biology, Pathology and Control. Blackwell Science Limited, Oxford, UK.
3. Marr JJ and M Muller, 1995. Biochemistry and Molecular Biology of Parasites. Academic Press Inc., San Diego, CA 92101, USA
4. Smyth JD and DIP McManus, 1989. The Physiology and Biochemistry of Cestodes. Cambridge University Press, New York, USA
5. Chappel LH, 1979. Physiology of Parasites. Blachie & Sons Ltd., Bishop Briggs, Glasgow, UK
6. Lee DL and HJ Atkinson, 1976. Physiology of Nematodes. Columbia University Press New York, USA
7. Electronic sources – digital libraries, books, journals, etc.

PARA-609 Special Problem 1(1-0)

Learning Objectives:
Upon completion of this course, students will be able to:

- Identify, review and plan to address the specific issues pertaining to parasitic diseases

The respective supervisor of the student will assign a topic of interest to make him understand the ways and means of addressing an issue pertaining to parasites

PARA-610 Seminar 1(1-0)

Learning Objectives:
Upon completion of this course, students will be able to:

- Identify, review, plan and orally present the specific issues pertaining to parasitic diseases

The respective supervisor of the student will assign a topic of interest to make him understand the ways and means of addressing an issue pertaining to parasites and present as a seminar

PARA-611 Biotechnology for Parasite Control 3(2-2)

Learning Objectives:
Upon completion of this course, students will be able to:

- understand the role of biotechnology in parasites control.
- have hands on training on different biotechnological techniques employed in experiments aimed at parasite diagnosis and control

Theory
Introductions to basic concepts in biotechnology; Conventional and modern biotechnology; Scope of biotechnology in parasite vaccine production; Molecular concepts, principles and approaches in biotechnology; Restriction endonucleases; Recombinant DNA technology; Expression systems; Cloning, sequencing and expression of genes; Application of biotechnology in diagnosis and control strategies against parasites; Molecular markers and probes to demonstrate host-parasite interactions; Use of modern biotechnology tools in molecular epidemiology and parasites' mutation and evolutionary studies; Introduction to genome/DNA analysis softwares (DNAman and BLAST); Review of literature through currently available resources on a topic of interest

Practical
DNA and RNA isolation protocols from blood and tissues and their quantification; Primer designing; Demonstration on restriction enzyme analysis, DNA amplification via the polymerase chain reaction, Southern and Northern blotting; Demonstration on construction and screening of genomic and cDNA libraries

Suggested Readings:
1. Wink M, 2006. An Introduction to Molecular Biotechnology - Molecular Fundamentals, Methods and Applications in Modern Biotechnology. Wileyliss Publications, USA
2. Ratledge C and B Kristiansson, 2006. Basic Biotechnology, 1st Ed., Cambridge University Press, UK
3. Smith JE, 2004. Biotechnology, 4th Ed., Cambridge University Press, UK
4. Marr JJ, TW Nilsen and RW Komuniecki, 2003. Molecular Medical Parasitology. Elsevier Publications, London, UK
5. Mowat N and M Rweyemance, 1999. Vaccine Manual: The Production and Quality Control of Veterinary Vaccines for Use in Developing Countries. Daya Publishing House, Delhi, India
6. Marr J and M Muller (Eds.), 1995. Biochemistry and Molecular Biology of Parasites. Academic Press, New York, USA
7. Electronic sources – digital libraries, books, journals, etc.

PARA-612 Food and Water Borne Parasitic Zoonoses 3(2-2)

Learning Objectives:
Upon completion of this course, students will be able to:

- understand the life cycle, pathology, epidemiology and control of food and water-borne parasitic diseases
- plan and execute experiments on public health significance of food and water-borne parasitic diseases

Theory
Inventory of food and water borne parasitic diseases; Study of tricka: Environment, food, water and parasites; Relationship of food and water-borne parasitic diseases; Significance of food and water-borne Zoonoses; Fish borne zoonotic diseases, Emerging zoonotic diseases; Epidemiology of zoonotic diseases; Plant-borne parasitic zoonoses; Prevention and control of parasitic zoonoses; Review of literature through currently available resources on a topic of interest

Practical
Orientation to food and water borne parasites; Examination of water for the presence of amoebic cysts and trophozoites; Application of trichnoscopy; Field study of ponds and lakes for parasites;

Suggested Readings:
1. Richardson DJ, 2010. North American Parasitic Zoonoses. Kluwer Academic Publishers, Norwell, MA, USA
2. Satoskar AR, GL Simon, PJ Hotez and M Tsuji (Eds.), 2009. Medical Parasitology. Landes Bioscience Publishers, Texas, USA (ISBN 978-1-57059-695-7).
3. Murrell KD and B Fried, 2007. Food Borne Parasitic Zoonoses (Fish and Plant Borne Parasites). Springer New York, NY, USA
4. Rathore VS, 2007. Parasitic Zoonoses, 2nd Ed., Pointer Publishers, Jaipur, India
5. Urquhart GM, J Armour, JL Duncan, AM Dunn and FW Jennings, 2003. Veterinary Parasitology. English Language Book Society, UK
6. Soulsby EJL, 1982. Helminths, Arthropods and Protozoa of Domesticated Animals. English Language Book Society, Baillere Tindall, London, UK
7. Electronic sources – digital libraries, books, journals, etc.

PARA-613 Research Methodologies in Parasitology 2(2-0)

Learning Objectives:
Upon completion of this course, students will be able to:

- Design experiments on different parasites by using different animal models
- Develop parasitological, immunological and molecular methods within experimental Parasitology
- Understand, how to interpret various diagnostic and experimental methods

Theory
Introduction to scientific research and methodologies; Research ethics; Data mining for developing the research proposals; Introduction to different data searching databases; Designing of parasitological research proposals; Epidemiological, Immunological, molecular and chemotherapeutic studies; Introduction to Pilot studies; Various Research aspects in Parasitology; Review of literature through currently available resources on a topic of interest

Suggested Readings:

1. LSE Public Policy Group, 2011. Maximizing the Impacts of Your Research: A Handbook for Social Scientists (http://cssp-jnu.blogspot.com/2011/06/lse-releases-maximizing-impacts-of-your.html**)**
2. Blum D, M Knudson and RM Henig, 2005. A Field Guide for Science Writers. Second Edition, Oxford University Press, USA.
3. Day RA, 1988. How to Write and Publish a Scientific Paper, 3rd Ed., Oryx Press, New York, USA.
4. Electronic sources – digital libraries, books, journals, etc.