



Department of Biology

College of Science

Salahaddin University

Subject: Diagnostic Parasitology

Course Book – 4

1. Lecturer's name: **Asst. Prof. Dr. Qaraman Mamakhidr Koyee**
2. Practical Lecturer's name: **Asst. Lec. Chreska N. Ahmed**

Academic Year: 2022/2023

Course Book

1.Course name	Diagnostic Parasitology (Theory & Praticcal)
2. Lecturer in charge	Dr. Qaraman M.K. Koyee Miss. Chreska N. Ahmed
3. Department/ College	Biology Department/ College of Science
4. Contact	e-mail: qaraman.koyee@su.edu.krd chreska.ahmed@su.edu.krd
5. Time (in hours) per week	Theory: 2 Practical: 6
6. Office hours	17 hours per week
7. Course code	SBio 404
8. Teacher's academic profile	Dr Qaraman M.K. Koyee is working as an Assistant Professor of Parasitology at Salahaddin University-Science College-Biology Department, since 11 Sept 2004 till now. He has MSc in Medical Parasitology and PhD in Molecular Parasitology . He has more than 20 published research

articles from **Local and International impact Journals** mostly around Parasite Identification and Taxonomy. He has **18 years** of **teaching experience** for different biological subjects (**Medical / General Parasitology**, Invertebrate Zoology, General and Basic Zoology, Virology, Mycology, Immunology, Microbiology, Parasite Phylogeny, Advanced Parasitology, Parasite Lab Diagnosis....) from different Colleges and Departments of the University. Currently, he is working on the **Biodiversity** and **Molecular Phylogeny of Parasites**.

The teaching experience is both theoretical and practical including:

Undergraduate:

- 1- **Medical Parasitology.**
- 2- **General Parasitology.**
- 3- **Diagnostic Parasitology**
- 4- **Mycology.**
- 5- **Zoology.**
- 6- **Immunology.**
- 7- **Medical Entomology.**
- 8- **Invertebrate Zoology.**
- 9- **Laboratory Techniques.**
- 10- **Helminthology.**
- 11- **Haematology**
- 12- **Virology**
- 13- **Human Anatomy**
- 14- **Protozoology**

Postgraduate:

- 1- **Advanced Parasitology (PhD & MSc.)**
- 2- **Parasite Phylogeny (PhD)**
- 3- **Experimental Parasitology (MSc.).**
- 4- **Molecular Parasitology (PhD)**
- 5- **Topics in Biology (MSc.)**

2017 Discussion Committee (HD Parasitology Thesis)

2020 Discussion Committee (PhD Parasitology Dissertation).

2021 Discussion Committee (PhD Invertebrate Dissertation).

List of Publications

	<ol style="list-style-type: none"> 1. Koyee, Q.M.K. and Faraj, A.M. (2007). Primary in vitro cultivation of <i>Entamoeba histolytica</i> in two different media with local materials. J. Med. Sci., 11(1): 11-16. 2. Koyee, Q.M.K. and Faraj, A.M. (2007). Evaluation and efficiency of grape juice (natural and artificial) in diagnosing intestinal parasites. J. Med. Sci., 11(2): 37-41. 3. Koyee, Q.M.K. (2009). Prevalence of <i>Blastocystis homines</i> among Orphanage, Infirmary and Schoolchildren in Erbil city Kurdistan Region-Iraq. . J. Duhok Sci., 12(1). 4. Koyee, Q.M.K.; Ahmed, R.K., Aziz, K.K.; Ahmed, H.S. and Abdula, A.H. (2011). Infestation rate with <i>Polyplax spinulosa</i> (burmeister, 1839) among certain laboratory albino rats (<i>Rattus norvegicus</i>) in relation to different washing agents in two Erbil city universities. Zanco J. Med. Sci., 15(1): 47-52. 5. Koyee, Q.M.K. (2011). Intestinal parasitosis in relation to blood groups among certain Bangladesh, Turkish and Kurdish people in Erbil city. J. Koya. Univ., 21: 97-108 2 6. Koyee, Q.M.K. (2011). <i>Hyalomma aegyptium</i> as a dominant tick on tortoises of the genus <i>Testudo graeca</i> in Erbil Province-Iraq. J. Duhok Sci., 14(1): 186-190. 7. Koyee, Q.M.K. and Faraj, A.M. (2011). A Coprological Diagnostic Comparison Between Zinc Sulphate Flootation and Formalin: Ether Sedimentation with Two Natural Extracts (Pomegranate Molasses and Honey). Diyala Journal of Medicine, 1(2): 83-89. 8. Koyee, Q.M.K. (2011). Prevalence of Some Parasitic Helminthes Among Slaughtered Ruminants (Sheep, Goats and Cattle) in Hawler Slaughter House During 2010, Hawler, Kurdistan Region, Iraq. 4th International Scientific Conference Salahaddin University (18-20 Oct.), 2: 594-596. 9. Koyee, Q.M.K. and Faraj, A.M. (2012). Epidemiology of Intestinal Parasites among Food handlers in Erbil City. Duhok Med. J., 6(1): 1-12. 10. Ali, W.K.; Koyee, Q.M.K.; Ahmed, R.K. and Abdullah, S.M.A. (2012). <i>Cuclotogaster heterographus</i> (Phthiraptera: Philopteridae) Infestation on the body feathers of Turkey <i>Meleagris gallopavo</i> as a new host from Erbil City, Kurdistan Region, Iraq. 7th Scientific Conference Tikrit University, 837-841. 11. Koyee, Q.M.K. and Steffensense, K. (2012). VP16-LXRβ act as both antiproliferative and lipogenic factors in MCF-7 breast cancer cell line, Duhok Med. J., 6(2): 119-128. 12. Ahmed, R.K.; Koyee, Q.M.K. and Rahemo, Z.I.F. (2012). Intestinal Parasites of Experimental Rodents with Testing the Efficacy of Diagnostic Methods. Int. Res. J. of Pharmaceuticals. 2(3): 77-81. 13. Koyee, Q.M.K.; Ahmed, R.K. and Abdullah, S.M.A. (2013). Seasonal Prevalence of Intestinal Parasites among Human in Kurdistan Region, Iraq During 2009. J. Koya. Univ., 26: 105-114. 14. Ali, W.K.; Koyee, Q.M.K.; Ahmed, R.K. and Abdullah, S.M.A. (2013). Prevalence of some medical Insects and Arachnids (Lice and Scabies)
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	<p>depending on records from the Ministry of Health in Kurdistan Region, Iraq. J. Pakistan Entomologist., 35 (2): 89- 93.</p> <p>15. Al-Marjan, K.S.N.; Koyee, Q.M.K. and Abdullah, S.M.A. (2015). In Vitro Study On The Morphological Development Of Eggs (Nits) And Other Stages Of Head Lice <i>Pediculus humanus capitis</i> De Geer, 1767. Zanco Journal, 27 (3): 35-40.</p> <p>16. Koyee, Q.M.K. and Faraj, A.M. (2015). Prevalence of <i>Cryptosporidium</i> spp. with other intestinal microorganisms among regular visitors of Raparin Pediatric Hospital in Erbil City-Kurdistan Region, Iraq. Zanco Journal, 27 (4):</p> <p>17. Koyee, Q.M.K.; Khailany, R.A.; Al-Marjan, K.S.N.; and Abdullah, S.M.A. (2016). Molecular-Based Identification of <i>Polystoma integerrimum</i> by 28S r DNA, Phylogenetic and Secondary Structure Analysis. Jordan Journal of Biological Sciences (JJBS), 9 (2): 117-121</p> <p>18. Hamad, K.Kh.; Ahmed, S.T. ; Ahmed, R.K. ; Koyee, Q.M.K. (2018). Phytotherapeutics: As anticipating substitutes to synthetic drugs in combating antinematocidal-resistant gastrointestinal nematodes of small ruminants. ZANCO Journal of Pure and Applied Sciences. 30 (4); 102-114</p> <p>19. Koyee, Q.M.K. and Abdullah, S.M.A. (2019). Phylogenetic and secondary RNA structure analysis of monogenean gill ectoparasites (<i>Dactylogyrus</i> spp.) parasitizing certain freshwater fishes. Polish Journal of Veterinary Sciences (PJVS). 22(4): 667- 675. DOI: 10.24425/pjvs.2019.129979.</p> <p>20. Koyee, Q.M.K. and Abdullah, S.M.A. (2019). Host Specificity, Community Components and Diversity Dynamics of <i>Dactylogyrus</i> spp. (Monogenean ectoparasites) Parasitizing Cyprinid Gills. Polish Journal of Environmental Studies (PJVS). 28(6): 1-13. DOI: 10.15244/pjoes/99064.</p> <p>Researches under Publication:</p> <ul style="list-style-type: none">• Certain species of Tape Worms that isolated from Domestic Pigeons of Erbil city.• Fruit and Vegetable parasites in Erbil city• Parasitic fauna of some amphibians in Erbil city <p>Magazine Articles:</p> <ul style="list-style-type: none">• A new idea about sensitivity and resistance of parasitic protozoa to metronidazole. In BioNews Magazine, No.3, year 2007• Transmission of parasites and their prevention. In BioNews Magazine, No.4, year 2008• Pin worm transmission and sleep disruption among children.• Toxoplasmosis and an important message to the pregnant women.
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	<p style="text-align: center;"><u>Further academic training and Participation in Conferences</u></p> <ol style="list-style-type: none"> 1. Teaching Mode Training held in Salahaddin University (Education Centre, Salahaddin University) (2007). 2. 4th international conference of Salahaddin University. (2011). 3. 4th Conference of biological sciences of Duhok University. (2012). 4. College of Science / Mathematic Department-Erbil Word and Windows Training / good degree 5. Central Laboratory / Erbil city Lab. of Haematology, Parasitology and Bacteriology (2003). 6. University of Salahaddin Training Centre –Erbil (USTC) English Course (1st July – 31st August 2007) 7. Rizgary Teaching Hospital – Laboratory Department From 8/7/2008 till 20/7/2010 3 8. PCR and Western Blot Technique Training / Sweden-Stockholm Advanced Molecular and Biochemical Techniques, From 13/10/2011 to 01/06/2012 9. ICDL-5 (Computer Training) / Computer Dept.-Science Education College-Erbil ICDL-5 (6 Weeks) 2013 10. 2nd Scientific Conference of the Faculty of Medical Sciences, University of Duhok-Iraq 19th -20th September 2012 11. Training program for COBAS E411 and COBAS C111 / Erbil Private KOLAB Laboratory for Clinical Analysis by Global Kurdi Group Company 18-23 / March 2017 12. 4th International Scientific Conference of Cihan University – Erbil on Biological Sciences (CIC-BIOS'17) – Cihan University - Erbil 26/27 – April - 2017 13. 2nd EPU symposium about Internationalization of Scientific Research in Kurdistan / Polytechnic University- Erbil 2/3 – May – 2017 14. Bioinformatics: Tools and Applications workshop. IT Dept. Science College / Salahaddin University - Erbil 16/17 – May - 2017 15. Health Education Seminar for Tourism Directorate / Erbil 20 – August - 2017 16. General Directorate of Tourism / Erbil 18 Jan. 2018
<p>Miss. Chreska N. Ahmed</p>	<p>She joined Salahaddin University/ College of Science/ Biology department in 2004, and obtained BSc in general biology in 2008.</p> <p>- From 2009-2017, worked at Salahaddin University/ College of Science/ Biology department, as an Assistant Biologist.</p> <p>- She has 14 years of teaching experience at (Biology and Environmental Science Department) and she taught many different practical biology labs to help students doing experiments with assistant lecturer and professors.</p>

	<p>1. Toxicology and Quality Control Lab at (Environmental Science Department) 2. Histology and embryology 3. Food and industrial microbiology 4. Ecology and pollution 5. Microbial genetic 6. Virology 7. Comparative anatomy 8. Entomology 9. Medical entomology 10. Microbial physiology 11. Sewage microbiology 12. Molecular and biotechnology 13. Micro technique 14. Hematology 15. Medical Parasitology 16. Invertebrates 17. Botany</p> <p>In 2019, She got MSc. Degree in Parasitology in Salahaddin University/ College of Science/ Biology department-Erbil/Iraq. She is currently, working as an Assistant Lecturer at Salahaddin University- College of science-Biology department, her specialist is Parasitology.</p> <p>-She has one published Research article in ZANCO Journal of Pure and Applied Sciences.</p> <p>(Chreska Nooraldin Ahmad, Kareem Khoshnow Hamad and Fikry Ali Qadir, 2019. <i>Haemonchus contortus</i> as a model in assessing activity of Citrullus colocynthis fruit extract to control benzimidazole-resistant parasitic nematodes. <i>ZANCO Journal of Pure and Applied Sciences</i>, 31 (5); 61-70.</p>
<p>9. Keywords</p>	<p>Parasitology, Diagnosis, Taxonomy & Identification</p>
<p>10. Course overview:</p>	<p>Diagnostic Parasitology is a science that deals with the study of parasite identification and the most abundant protocols for identifying them, including direct wet mount, floatation concentration, sedimentation concentration, modified acid-fast stain, sample collection, preservation, processing, temporary and permanent slide preparation. The course will be 3 credit hours. Two credit hours will be designated for theory lectures and one credit hour for practical parts. The course will contain an introductory part, in which basic concepts of diagnostic parasitology are introduced and major terms are defined; then, specialized topics will be tackled in a systematic approach to cover the major diagnostic procedures of the parasite and the frequent pseudo parasites of the collected samples.</p> <p>Diagnostic Parasitology is a dynamic field that has always been on the frontier of clinical investigation within the scope of human disease, therefore student can get secure employment through having</p>

more scientific knowledge about all diagnostic parasitological procedures. The best way for investing their quality in making private laboratory.

11. Course objective:

The course is especially planned for undergraduate students who intend to work in diagnostic laboratories. Upon the completion of the course, students would have benefited from the following objectives of the course:

1. Explain major concepts in parasitology, including General Stool Examination (GSE), General Urine Examination (GUE), Seminal Fluid Analysis (SFA), Temporary and Permanent parasitological slide preparation.
2. Elucidate the basis of Gastro-intestinal and Urinary system diseases, including intestinal disorders, hepatic diseases, Dysentery and diarrhoea, and infertility disorders.
3. Clarify in detail the major concepts regarding the major human exudates for identification.
4. Provide the latest information regarding the newest techniques utilized by Parasitologists to treat and diagnose gastro-intestinal, blood, and urinary disorders.

12. Student's obligation

- Students should attend all lectures and not miss any lecture time.
- Additionally, for each lecture, the student should prepare and follow up with sufficient studying time to cover the material presented in the class during that lecture.
- It is highly advised not to accumulate material until before the examination time. Cramming will definitely weaken the student's ability to understand and retain valuable information.
- Students prefer to attend all the seminars on time which held in our department especially seminar about Parasitological Diagnostic Techniques.

13. Forms of teaching

Teaching with technology can deepen student learning by supporting instructional objectives.

- Data Show Projector
- Whiteboard
- Video and Practical Laboratory Techniques

14. Assessment scheme

Breakdown of overall assessment and examination

Grading System:

Exam No. 1 (Theory): **7.5%**

Exam No.2 (Theory): **7.5%**

Mean Examination (Theory): **7.5 %**

Practical Examination: **17.5%**

Total =25 %

Final examination: 25% theory

15. Student learning outcome:

1. Interpret parasitological test results and evaluate stages of the parasites to analyse the differential diagnosis and suggest further tests to determine the actual diagnosis for a wide range of parasitological disorders.
2. Understand and be able to communicate the non-pathogenic parasite and pathogenic parasite

conditions associated with various organs of the body systems.
 3. Understand how to process, preserve, diagnose and interpretate the laboratory specimen results.
 4. Communicate scientific and parasitological concepts clearly, concisely and logically.
 5. Practise parasitology within the laboratory environment safely and with due regard to occupational health and safety guidelines.

16. Course Reading List and References:

1. Garda, L.S. (2021). Practical Guide to Diagnostic Parasitology. 3rd Ed. Wiley. 568pp.
2. Mundt, L.A. and Shanahan, K. (2016). Graff's Textbook of Urinlysis and Body Fluids. 3rd Ed., Wolters Kluwer. 318pp
3. Text Book of Medical Parasitology (Protozoology and Helminthology), Text and color atlas, (2004) by Parija, s.c. 2nd edition, medical books publishers, Chennai, New delhi.
4. Text book of parasitology, (1965), by Belding, D.L., 3rd edition, appleton century crofts, New York.
5. Foundation of Parasitology (2000), by Roberts, L.S. and John Janovy, Jr. 6th edition, McGraw-Hill higher education, New York.
6. Diagnosing Medical Parasites: A Public Health Officers Guide to Assisting Laboratory and Medical Officers (2010) by Cuomo, M.J., Noel, L.B. and White, D.B. Capt.
7. Foundations of Parasitology (2009), by Roberts, L.S. and John Janovy, Jr., 8th ed. McGraw- Hill higher education, New York
8. Human parasitology (2013) by Burton J. Bogitsh, Clint E. Carter and Thomas N. Oeltmann , 4th ed. Academic press in an imprint of Elsevier/ New York.
9. WHO (2003). Manual of Basic Techniques for a health Laboratory. 2nd Ed., Geneva. 384pp.

17. The Topics: Week Numbers	The Lecture name topics
Week 1	Introduction to Diagnostic Parasitology
Week 2	Sample Collection, Transportation and Preservation methods.
Week 3	Direct saline, Iodine and eosin stool wet mount
Week 4	Stool Concentration Technique (Floatation & Sedimentation)
Week 5	General Urine Examination
Week 6	Staining Techniques in Parasitological protozoa
Week 7	Trematodes, Cestodes and Nematodes Mounting and staining for Taxonomical studies
Week 8	Detection of Blood Parasites (Thick and Thin Smear)
Week 9	Faecal Fat, Faecal pH & Stool reducing sugar tests
Week 10	Faecal Occult Blood (FOB)
Week 11	Cellophane Tape Technique
Week 12	Modified Ziehl-Neelsen Method for <i>Cryptosporidium</i> spp. (Cold and Hot Methods)
Week 13	Immuno-chromatographic Method for detecting <i>E. histolytica</i> , <i>G. lamblia</i> and <i>Cryptosporidium</i>
Week 14	Pseudo-parasites and artifacts
Week 15	Ectoparasite identification
Examination	
18. Practical Topics	
Week Numbers	The Practical Topics
Week 1	Direct saline, Iodine and eosin stool wet mount

Week 2	Modified Acid Fast Stain for <i>Cryptosporidium</i> spp.
Week 3	Formalin-Ether Sedimentation Technique
Week 4	Saturated Salt Solution Flootation Technique
Week 5	General Urine Examination
Week 6	Staining Techniques in Parasitological protozoa
Week 7	Trematodes, Cestodes and Nematodes Mounting and staining for Taxonomical studies
Week 8	Detection of Blood Parasites (Thick and Thin Smear)
Week 9	Faecal Fat, Faecal pH & Stool reducing sugar tests
Week 10	Faecal Occult Blood (FOB)
Week 11	Cellophane Tape Technique
Week 12	Baermann Technique
Week 13	Immunochromatographic Method for detecting <i>E. histolytica</i> , <i>G. lamblia</i> and <i>Cryptosporidium</i>
Week 14	Pseudo-parasites and artifacts
Week 15	Ectoparasite identification
Examination	

19. Examinations: Theory

Examples of Semester Examinations

Theory of [Diagnostic Parasitology](#) Exam

Sunday 23 October 2022

Q1: Define the following

Faecal fat Test, PVA, Lugol's Iodine, Charcoat lyden crystals, Urobilin

Q2. Write the important of the following

1. Cellophane Tape Technique.
2. Zink-sulphate floatation Technique
3. pH of urine sample.
4. Sperm motility index

Q3. What are the differences between amoebic and bacillary dysentery?

Q4. What has been the “gold standard” for stool collection systems?

Q5. What is the basis for the recommendation that three stools should be collected on alternate days, rather than 3 days in a row or three in one day?

Lecturer

Assist Prof. Dr. Qaraman M.K. Koyee

Examination (Practical)

Examples of Semester Examination

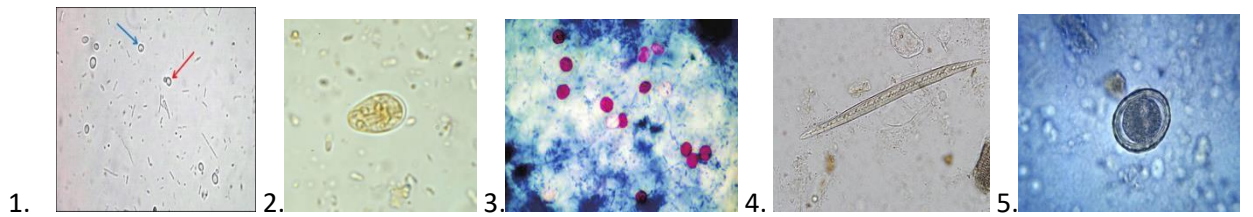
Practical Diagnostic Parasitology exam

Sunday 16 October 2022

Q1/ What is the principle of the following techniques

1. Acid-fast stain
2. Concentration method
3. Flotation techniques

Q2/ Identify the following slides:



Q3/ Write the methods of faecal sample preservation in Lab?

Q4/ what are the abnormal colours of urine & possible causes mention them briefly?

Q5/ How could you prepare the permanent slide in lab? mention the steps

Lecturer

Miss. Chreska N. Ahmed

20. Extra notes:

21. Peer review پیداچوونہوہی