

**COURSE DATA****Data Subject**

Code	40350
Name	Helminthiasis and Medical Entomology
Cycle	Master's degree
ECTS Credits	12.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2038 - M.U. en Enfermedades Parasitarias Tropicales 09-V.1	Faculty of Pharmacy and Food Sciences	1	Annual
3145 - Human and Animal Parasitology	Doctoral School	0	First term

Subject-matter

Degree	Subject-matter	Character
2038 - M.U. en Enfermedades Parasitarias Tropicales 09-V.1	2 - Helminthiasis and medical entomology	Obligatory
3145 - Human and Animal Parasitology	1 - Complementos de Formación	Optional

Coordination

Name	Department
CORTES CARBONELL, ALBA	358 - Pharmacy, Pharmaceutical Technology and Parasitology

SUMMARY

Included in the Master Course, the subject on Helminthiasis and Medical Entomology provides the students with a complete parasitological training providing a global overview as well as a detailed study of the main aspects on human helminthiasis and medical entomology. The subject covers the study of the aetiological agents, life cycles, epidemiology, sources of infection, pathology and clinical symptoms, diagnosis, treatment and control measures of the main trematodiasis, cestodiasis, geo- and ageo-helminthiasis and nematodiasis with vectorial transmission. The subject also includes arachnology and medical entomology focusing mainly on dipterology. The impact of parasites produced by helminths is made unaware of the Sustainable Development Goals (SDG), specifically with Goal 3 aimed at guaranteeing a healthy life and promoting well-being.



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

It will be necessary to be in possession of one of the following degrees: pharmacy, medicine, veterinary medicine, biology, microbiology, food science and technology, human nutrition and dietetics, environmental sciences, nursery, physiotherapy. In case of foreign students, these will have to be in possession of an official degree similar to one of the aforementioned qualifications.

OUTCOMES

2038 - M.U. en Enfermedades Parasitarias Tropicales 09-V.1

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Contemplar en conjunto y tener en cuenta los distintos aspectos y las implicaciones en los distintos aspectos de las decisiones y opciones adoptadas, sabiendo elegir o aconsejar las más convenientes dentro de la ética, la legalidad y los valores de la convivencia social.
- Be able to integrate into teams, both as managers or coordinators and for specific and limited functions and in support of the team or of others.
- Ser capaz de asumir cualquiera de las tareas y responsabilidades relacionadas con las enfermedades parasitarias humanas: preparación práctica y formación teórica actualizadas de sanitarios para desempeñar trabajos, funciones y cargos de todo tipo y nivel en el amplio campo de la lucha, control, diagnóstico, difusión, enseñanza y estudio de las enfermedades parasitarias en todo el mundo.
- Conocer las enfermedades parasitarias en todos sus aspectos de etiología (caracterización morfoanatómica y molecular, ciclo biológico), epidemiología, clínica (sintomatología y patología), diagnóstico (etiológico, inmunológico y molecular), profilaxis y control.
- Conocer la terapéutica antiparasitaria.

LEARNING OUTCOMES



Students who pass the subject are able to assume any task and/or responsibility related with human helminths, such as practical training and providing updated theoretical knowledge to health workers facing aspects such as diagnosis, control or teaching human helminthology. The subject also qualifies the students to identify the main arthropods of medical relevance. The training includes:

- ability to develop experimental models to characterise parasite-host systems;
- training in all the multidisciplinary aspects of schistosomiasis and fascioliasis, as well as of their vector snails;
- ability to analyse objective (medical profile) as well as subjective (culinary habits, travels, clinical background, etc) symptoms to recognize a parasitosis by tapeworms. Also being able to handle samples adequately and performing the most appropriate diagnostic methods, giving advice on the best treatment and also being able to implement the most accurate preventive measures;
- training in all the multidisciplinary aspects of geo- and helminths and nematodes transmitted by vectors;
- acquiring basic knowledge on the identification of arthropods of medical interest at larval (including myiasis) as well as adult stages and also acquiring skills on their epidemiology and control.

DESCRIPTION OF CONTENTS

1. Human Trematodiasis

- In-depth multidisciplinary study of Trematodiasis;
- In-depth theoretical and practical study of the main human Trematodiasis;
- Specific analysis of the problem of these diseases in tropical and subtropical countries as well as other parts of the world;
- Study of all aspects of these diseases (morphoanatomy and life-cycle), epidemiology, clinical presentation (symptoms, pathology), diagnosis (aetiological, immunological, molecular), treatment, prophylaxis and control.

3. Schistosomiasis and fascioliasis

Schistosomiasis or Bilharziasis: general analysis of the aetiology, life-cycle, transmission, pathogenesis, symptomatology, diagnosis, treatment and control.

- Fascioliasis: general analysis of the aetiology, life-cycle, transmission, pathogenesis, symptomatology, diagnosis, treatment and control.
- Medical malacology: study of the snails vectors acting as intermediate hosts in the transmission of Schistosomiasis and Fascioliasis, as well as other human helminthiasis.



4. Cestodiasis

Cestodiasis caused by adult stages: Diphylobothriasis, Taeniasis, Hymenolepiasis, Dipylidiasis, unusual Cyclophyllids.

Cestodiasis caused by larval stages: esparganosis, cysticercosis, hydatidosis, alveococcosis, coenurosis, unusual metacestodiasis.

5. Geohelminthiasis and Ageohelminthiasis

Characterization and general study of human ageohelminths: *Trichuris trichiura*, *Ascaris lumbricoides* and *Enterobius vermicularis*;

- detailed analysis of Trichurosis or Tricocefalosis, Ascariasis and Oxiuriasis or Enterobiosis;
- Characterization and general study of other Trichuridae and Ascarididae and of the parasitoses caused;
- specific analysis of Anisakiasis;
- Characterization and general study of human geohelminths: *Strongyloides stercoralis*, *Ancylostoma duodenale* and *Necator americanus*;
- detailed analysis of Strongiloidosis or Anguilulosis and of human Ancilostomosis;
- Characterization and general study of other Strongylidae and of the parasitoses caused.

6. Nematodiasis of vectorial or indirect transmission

- Nematodiasis transmitted by vectors: lymphatic filariasis: *Wuchereria* and *Brugia*; dermic filariasis: *Loiasis* and *Onchocercosis*; other filariases: *Mansonellosis*; *Dirofilariasis*
- Nematodiasis transmitted by accidental ingestion of the vector: *Dracunculiasis*
- Brief study of the morphology and biology of vectors: *Culicids*, *Cryptops* horsefly, *Simuliids*, *Culicoides* and *Cyclops*

7. Arachnology and Medical Entomology

-Arachnids of medical importance: mites (*Sarcoptidae*, *Trombiculidae*, *Demodicidae* and others), ticks (*Ixodidae* and *Argasidae*) and cockroaches (*Blattaria*).

-Non-Diptera insects: lice and pubic lice (*Anoplura*), fleas (*Siphonaptera*), bedbugs (*Cimicidae* and *Triatominae*)

**8. Parasite Dipterology**

- Dipteran Nematocera: black-flies (Simuliidae); phlebotomine sand-flies (Phlebotominae); biting midges (Ceratopogonidae); mosquitoes (Culicidae), culicine and anopheline.
- Dipteran Brachycera: horse-flies (Tabanidae); house and vector flies (Cyclorrapha).
- Human myiasis caused by dipteran larvae, mainly flies.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	120,00	100
Development of group work	10,00	0
Development of individual work	10,00	0
Study and independent work	50,00	0
Readings supplementary material	25,00	0
Preparation of evaluation activities	25,00	0
Preparing lectures	40,00	0
Preparation of practical classes and problem	10,00	0
Resolution of case studies	10,00	0
TOTAL	300,00	

TEACHING METHODOLOGY

Theoretical master class, allowing the teacher to highlight the most important aspects of every lesson. Each master class will be accompanied by graphical material. Tutorial or meeting between the teacher and a group of students with the purpose of exchanging information, analysing, orientating or evaluating a problem or a project, of debating a topic etc. useful for the academic and personal development of the student. Participative model in the practical classes, guiding the work of the student in the laboratory, so that the knowledge acquired in the theoretical classes is practically applied and correct microscopic vision of the studied parasites is achieved.

EVALUATION

A student will pass the module with a minimum of 5 points out of 10.

Taking a written **obligatory examination** (90%), which includes questions, topics to be developed, concepts, problems or questions of reasoning, tests, drawings or schemes with questions, etc. The contents will include that the theoretical/practical lessons. The mark of the **continuous evaluation** (partial questionnaires, partial tasks, participation, motivation, assistance, etc.) makes up 10% of the final mark of the module.



The copy or manifest plagiarism of any task that is part of the evaluation will imply the impossibility of passing the subject, then submitting to the appropriate disciplinary procedures.

Please note that, in accordance with Article 13. d) of the University Student Statute (RD 1791/2010, of December 30), it is the duty of a student to refrain from using or cooperating in fraudulent procedures in the evaluation tests, in the works carried out or in official documents of the university.

REFERENCES

Basic

- BEAVER, (P.C.), JUNG (R.) & CUP (E.W), 2002.- Parasitología clínica de Craig Faust.: MASSON, S.A. (Barcelona). ISBN: 968-6099-50-6, 3a Edic.
- SCHMIDT (G.D.) & ROBERTS (L.S.), 2004.- Foundations of Parasitology. McGraw-Hill College. ISBN: 0072348984
- ASH, L.R. & ORIHEL, T.C. (1997).- Atlas of Human Parasitology. 4o edition. American Society of Clinical Pathologist (ASCP) Press, Chicago.
- FRIED (B.) & TOLEDO (R.) (eds.), 2009.- The biology of echinostomes. From the molecule to the community. Springer Science, New York (USA), 333 pp.
- BUSH (A.O.), FERNANDEZ (J.C.), ESCH (G.W.) & SEED (J.R.), 2001.- Parasitism. The diversity and ecology of animal parasites. Cambridge University Press, Cambridge (U.K.), 566 pp.
- MAS-COMA (S.), BARGUES (M.D.), MARTY (A.M.) & NEAFIE (R.C.), 2000.- Hepatic trematodiasis. En: Meyers, W.M., Neafie, R.C., Marty, A.M., Wear, D.J. editors. Pathology of Infectious diseases, Vol. 1 Helminthiasis, Armed Forces Institute of Pathology and American Registry of Pathology, Washington D.C.: 69-92
- BURTON (B.J.), CARTER (C.E.) & OELTMANN (T.N.), 2005.- Human Parasitology. Editorial: ACADEMIC PRESS, Inc. ISBN: 0-12-088468-2, 3a Edic
- SECOR (W.E.) & COLLEY (D.G.) edit., 2006.- World Class Parasites: Schistosomiasis, Vol. 10. Springer, New York, 235 pp.
- SERVICE, M.W. (2004).- Medical Entomology for Students, Third Edition - Cambridge University Press, ISBN 052154775X
- MARQUARDT, W. (2004).- Biology of disease vectors, 2nd edition. Academic Press, ISBN 0-12-473276-3
- ELDRIDGE (B.F.) & EDMAN (J.D.), 2004. Medical Entomology: A Textbook on Public Health and Veterinary Problems Caused by Arthropods (2nd ed.). Kluwer Academic Publishers, Dordrecht, 672 pp.
- SERVICE, M. (2012).- Medical Entomology for Students, 5th Edition Cambridge University Press, ISBN 9781107668188



- MAS-COMA (S.), 2004.- Human fascioliasis. In: World Health Organization (WHO), Waterborne Zoonoses: Identification, Causes and Control. (J.A. Cotruvo, A. Dufour, G. Rees, J. Bartram, R. Carr, D.O. Cliver, G.F. Craun, R. Fayer & V.P.J. Gannon edit.), IWA Publishing, London, UK: 305- 322.
- MULLER (R.). 2001.- Worms and human disease. ISBN: 0-8519-9516-0, 2a Edic.,
- FLISSER (A.) & PEREZ-TAMAYO (R.), 2006.- Aprendizaje de la Parasitología basado en problemas. ETM, ISBN 968-5610-43-6

Additional

- MAS-COMA (S.), VALERO (M.A.) & BARGUES (M.D.) 2009.- Chapter 2. Fasciola, lymnaeids and human fascioliasis, with a global overview on disease transmission, epidemiology, evolutionary genetics, molecular epidemiology and control. *Advances in Parasitology*. 69: 41-146.
- MAS-COMA (S.), VALERO (M.A.) & BARGUES (M.D.) 2009.- Climate change effects on trematodiasis, with emphasis on zoonotic fascioliasis and schistosomiasis. *Veterinary Parasitology* 163:264-280.
- TOLEDO (R.), ESTEBAN (J.G.) & FRIED (B.), 2006.- Immunology and Pathology of Intestinal Trematodes in Their Definitive hosts. *Adv Parasitol*, 63, 289-370.
- MAS-COMA (S.), BARGUES (M.D.) & VALERO (M.A.), 2005.- Fascioliasis and other plant-borne trematode zoonoses. *Int. J. Parasitol.*, 35:1255-1278
- GALLEGO BERENGUER, J. (2003).- Manual de parasitología: morfología y biología de los parásitos de interés humano. Ediciones de la Universitat de Barcelona, Barcelona.