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**Department of plant protection**

**College of Agriculture**

**University of Salahaddin**

**Subject:Insect Taxonomy**

**Course Book (Year 2)**

**Lecturer's name: Nabeel AbdulKhader Mawlood PhD**

**Lecturer's name Hozan Qadir Hamamurad, MSc Lecturer's name GazangTaher Omar, MSc**

**Academic Year: 2018/2019**

**Course Book**

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| **1. Course name** | **Insect Taxonomy** |
| **2. Lecturer in charge** | **Nabeel Abdulqadir Mawlood****Hozan Qadir Hammamurad****GazangTaher Omar** |
| **3. Department/ College** | **plant protection/ Agriculture**  |
| **4. Contact** | **e-mail:nabeel.mawlood@su.edu.Krd****Tel: (optional): 07503706215****e-mail:****hozan.hamamurad@su.edu.krd****Tel: (optional) 0750 4824927****e-mail:****gazang.omar@su.edu.krd****Tel: (optional) 0750 4546799** |
| **5. Time (in hours) per week**  | **For example Theory: 2** **Practical: 3**  |
| **6. Office hours** | **Availability of the lecturer to the student during the week** |
| **7. Course code** |  |
| **8. Teacher's academic profile**  | * Date of Birth: 2 / 5 / 1957
* Sex: Male
* Nationality: Iraqi
* Marital Status: Married

Address:Rasti Q. -Erbil –Kurdistan Region-Iraq Telephone :07705042177E-mail: Nabeel\_akm57@yahoo.com  : : nabeel.mawlood.@su.edu.krdCertifications :* B.SC :College of Agriculture ,Mosul University/ Iraq (1980) .
* M.Sc. : College of Agriculture ,Baghdad University /Iraq (1985)

Taxonomic study of the beetles Family Dermestidae ( Insecta : Coleoptera ) in Baghdad University Iraq(1985) .* PhD. : College of Agriculture ,Baghdad University/Iraq(2001)

Taxonomic study of the blowflies ( Diptera : Calliphoridae) in middle of Iraq . / Baghdad University (2001). General Specialty : Agriculture –Plant ProtectionSpecialty : Entomology ( Insects Taxonomy )Job TitleProfessor in Department of Plant protection / College of Agriculture / Salahaddin University Scientific Titles

|  |  |
| --- | --- |
|  Title |  Date |
|  Assistant Lecturer |  1986 |
|  Lecturer |  1990 |
|  Assistant Professor |  1994 |
|  Professor |  2002 |

Description of Main Duties & Responsibilities:* Head of Community Health Department / Technical Institute - Baquba / Diyala / 1997
* Head of Biology Sciences Dept. / College of Education - University of Diyala /2005
* Chairman of the Scientific Promotion Committee in College of Science/ Diyala University / 2004 – 2007
* Member of the Central Committee of Promotions - University of Diyala , 2003 - 2005
* Secretary Editor of Diyala Journal - College of Education, University of Diyala, 2005-2006
* Editor of Diyala journal - Colleg of Education / University of Diyala / 2006 -2007
* Editor of the Al- Yarmouk University Journal / University of Diyala / 2006 -2007
* Member of the examination Committee for Graduate Studies - College of Agriculture - University of Salahaddin 2008 -2009
* Member of scientific Committee in the College ofAgriculture, University of Salahaddin / 2009 -2019
* Member of scientific committee in the Department of Plant Protection ,College of Agriculture, University of Salahaddin / 2009 -2019
* Chairman of the Quality Assurance Committee in the College of Agriculture -Salahaddin University / 2009 – 2010
* Member of the Joint Committee of Higher Education (Board) - University of Dohuk College of Agriculture from 2010 to 2011
* Member of the Quality AssuranceCommittee in the plant protection department of College of Agriculture - Salahaddin University / 2010 - 2011

MEMBERSHIP OF PROFESSIONAL ASSOCIATION:* Member of the Syndicate of Agricultural Engineers / Baghdad -1980
* Member of the Association of Agricultural Engineers of Baghdad , 1980
* Member of the Association of Agricultural Engineers of Erbil , 2008
* Member of Teachers Syndicate / Erbil -1986

Number of published researches : More than ( 70 )Numberof MSc and PHD students : ( 25 )* Date of Birth: 12 / 6 / 1985
* Sex: Female
* Nationality: Iraqi
* Marital Status: Single

Address: Salahaddin- Erbil- Kurdistan Region- Iraq.Phone number: 00964 750 482 4927E-mail: hozanKadir @yahoo.com;  hozan.hamamurad@su.edu.krd Certifications :B.SC : College of Agriculture , Plant Protection Department Salahaddin University/ Erbil/ Iraq* 2004- 2008 .

M.Sc. : College of Agriculture, Plant Protection Department , Salahaddin University/ Erbil/ Iraq* 2014.

Taxonomic study of leaf beetles (Coleoptera: Chrysomelidae) in some Localities of Kurdistan Region-Iraq.  General Specialty : Agriculture –Plant Protection Department Specialty : Entomology (Plant Protection) ; Insects Taxonomy .Job TitleLecturer in Department of Plant protection / College of Agriculture / Salahaddin University Scientific Titles

|  |  |
| --- | --- |
|  Title |  Date |
|  Assistant Lecturer |  2014 |
|  Lecturer |  2018 |

Number of published researches : ( 9 )Lecturer name: **GazangTaher Omar** , born 1982 , BSc degree in plant protection 2001-2005, 3th -10 had started working as an academic staff (teaching assistant) in 25-10-2005 in the college of Agriculture / plant protection department Salahaddin university, taking post graduate courses for 2 year in college of agriculture plant protection department in Salahaddin university getting MSc. Degree In Entomomlogy (plant protection) working as an assistant lecture also member in agriculture engineering syndicate in Hawler, taking a course on teaching method in 2011,The same University ( Salahaddin).Now PhD student in practical stage. Giving a pre graduating course of insect taxonomy to students in 2nd class Working in one researches1. A New species of comb-clawed beetle *Cteniopus*Solier, 1835 (Coleoptera: Alleculiidae) from Erbil Governorate Kurdistan Region-Iraq.

Description of dark beetle, OpatroidespunctulatusBrullé, 1832 (Coleoptera: Tenebrionidae: Opatrinae) from Iraq , Erbil province. |
| **9. Keywords** | **Morphology , character , orders , differences, Anatomy**  |
| 10. Course overview:This course is an exploratory, first course in insect identification, recognition and namingdesigned primarily for students in biological sciences. However, it also meets the need ofstudents in other fields such as crop protection and soil sciences. It provides information history of insect evolutions, systems involved in naming insects, identification and classification of different insects as well as collection and preservation of such insects. It involves practical periods aimed at exposing the students to different species of insect to enable them identifies them to families level. Topics to be covered include insect systematic and evolution, successes of insects, use of identication keys, methods of collection and preservation of insects.Insect classification, and thereby entomological nomenclature and more particularly insect scientific names have undergone many reorganisations and modifications over the last decades. The general public is not familiar with scientific nomenclature, whether zoological or botanical. Moreover, their notion of what a species is or represents is quite vague. o name an animal or a plant species, people generally use the words « a kind of », a sort of », « a variety », « a race ».Such approximate and therefore imprecise language highlights how difficult it is for the public to name or apprehend some “thing”, whether animal or plant, that more or less looks like some “thing” else. For scientists, the word “species” has a well-defined meaning: it is the basic unit (also called taxon) of systematic classification. Although the concept of “species” is currently interpreted in different ways by the scientific community, its main feature is inter-fecundity, i.e. the capacity for individuals belonging to a same population to interbreed and give birth to viable, fecund offspring in natural conditions. |
| **11. Course objective:** The goal of this course is to provide you with a sound theoretical and practicalunderstanding of both insect diversity and the practice of classifying organisms. Lecturesdiscuss the general principles of systematics, history of insect classification, constructionand use of identification tools, nomenclature, and biology and evolutionary history of thehexapod orders. We also explore why competing classifications exist in taxonomy, andwhat existing classifications imply about broad patterns of evolutionary change anddiversification within insects. Laboratory work focuses on the means of recognition ofthe major groups of insects (order and family); in-class exercises illustrate conceptsdiscussed in lecture. A collection is required that will further refine your ability toidentify insects to the level of order, family and in many cases species. Accumulating therequired numbers of taxa will be possible only by employing a variety of collectingtechniques. Building an insect collection, with correctly identified and curated specimensis an excellent way to learn, understand and employ the methods used by professionals toclassify not only insects, but living organisms in general.The main objectives of this course are to:introduce students to collection, identification and naming of different insect species provide students with opportunities to prepare insect boxes and identify all the insectscollected to family level and also preserve some of the insects collected for future use. |
| **12. Student's obligation**In this part the role of students is as follow : Student Attendance in lecture and examination , preparing reports about some important course subjects , writing an assignment on any field visiting , doing daily quiz , giving samples  |
| **13. Forms of teaching**Teaching methods are , using data show ways , power point , white board , giving hand note  |
| **14. Assessment scheme**Breakdown of overall assessment and examination25 marks for theoretical part The marks is divided as follow :10 marks for 1st monthly exam and 10 marks for 2nd, 1st exam : / 3/ 2019;2nd /4/20192 marks for daily quiz 2 for reports1for class conversation Final examination 20 practical part , 40 for theoretical parBreakdown of overall assessment and examination20 marks for practical part The marks is divided as follow :10 marks for 1st monthly exam.3 marks for daily quiz 5 for sample collecting2 for reports |
| **15. Student learning outcome:**Upon successful completion of this course, the student will be able to:(Knowledge based)explain what insect systematic is all about;classify insects into different families based on similarities and differences that existamong them;explain the function of the identification key;explain the different techniques used in insect collection and how these insects can bepreserved;know the different features peculiar to each insect family.(Skills)prepare good insect box which will include the names and families of all insect collectedandpreserve some insects collected in specimen bottles using appropriate chemicalsUpon completion of this course you will be able to:- Sight identify all hexapods to order and the majority of common insects to family- Describe key innovations in life history, growth, development and behavior for eachinsect order.- Draw a phylogenetic tree depicting the relationships among hexapod orders- Collect insects and record field data in any habitat using a variety of differentmethods, and list the strengths and weaknesses of each technique- Preserve insects by pinning, point mounting, slide mounting and preservation inethanol.- Prepare specimens for deposition into a museum collection, including labeling,packing and shipping.- Describe the taxonomic process: how species are described, named and classified.- Explain the importance of insects to global biodiversity and conservation.Due to our given topic to students they will learn how to describe external , internal and classifying insects and recognized all body parts. This course is a general introduction to entomology with an emphasis on insect diversity. We will provide an evolutionary perspective on the basic taxonomy, habits, morphology, habitats, and life history strategies of insects. Students will be expected to attain some fluency in the language of entomology, showing an understanding of basic insect structure and the overall diversity of the Insect. They will learn to extrapolate from general patterns of life history and behaviour to specific predictions about the biology of most of the animals encountered in terrestrial and freshwater environments. The laboratories will work synergistically with the lectures to reinforce recognition of large and important taxa (orders, families) and to identify other taxa using dichotomous keys. In both the lecture and the laboratory the emphasis will be on the attainment of practical skills needed by teachers, naturalists, and field biologists in a variety of related disciplines. This handbook provide information on exactly what excepted learning outcomes and what methods can be used to assess them. |
| **16. Course Reading List and References‌:**▪https://insects.tamu.edu/students/undergrad/ento305/index.html;**▪**Snodgrass, R. E. (December 1993). Principles of Insect Morphology. Cornell Univ Press. [*ISBN*](https://en.wikipedia.org/wiki/International_Standard_Book_Number) [*0-8014-8125-2*](https://en.wikipedia.org/wiki/Special%3ABookSources/0-8014-8125-2).**▪**Gordh, G. & Headrick, D. (2001).  A Dictionary of Entomology. CABI Publishing, New York.**▪** [Copyright © 1997-2015 Amateur Entomologists' Society](http://www.amentsoc.org/help/copyright.html)- John, R.M.(2016). General Entomology. Disclaimer, 1-3p.- Hoell, H.V.; Doyen, J.T. and Purcell, A.H. (1998). Introduction to insect Biology and Diversity, Ox. Uni., 2nd ed. 320pp.**-**www.earthlife.net/search.html |
| **17. The Topics:** | **Lecturer's name** |
| Subject Weeks Taxonomy , its history and function 1StPrincipal kingdom of living organs ,characteristicsand its Phylum , Phylum Arthropoda , Taxonomic key of Classes 2ndThe species , Subspecies , and higher categories ,Taxonomic characters3rdTaxonomic procedure methods of insect collection, Kind of Types4thSteps of identification , Classification , Nomenclature and identification of insects and their relatives5thTaxonomic discrimination major types of variation , The international rules of zoological nomenclature6thStudy of insects Order , Subclass : Apterygota, Order :Collembola , Thysanura , Protura , Diplura7thSubclass: Pterygota , Order : Ephemeroptera,Orthoptera , Dictyoptera , Phasmida8thSubclass: Order : Odonata , Dermaptera , Isoptera9thOrder :, Hemiptera , Homoptera10thOrder : Anoplura , Mallophaga , Thysanoptera , Plecoptera11thOrder : Neuroptera , Siphonoptera , Mecoptera , Zoraptera12thOrder : Diptera , Coleoptera , Psocoptera13thOrder : Lepidoptera , Trichoptera,14thOrder Embioptera , Hymenoptera, 15thCollege of Prof. Dr. Nabeel AdulKadir Mawlood / LecturerCollege of Agriculture  Department of Plant Protection 2nd classbject : Insect Taxonomy Year : 2015 - 2016  Marks of Spring Semester / 40% Marks Monthly Examinations No.101st exam / Theoretical 1 102nd exam / Theoretical 23Daily exam (quiz ) 32 Students reports 425Total / Theoretical 551st exam / practical 652nd exam / practical 75daily exams ++Reports Activity 815Total practical 940Grand totSubject Weeks Taxonomy , its history and function 1StPrincipal kingdom of living organs ,characteristicsand its Phylum , Phylum Arthropoda , Taxonomic key of Classes 2ndThe species , Subspecies , and higher categories ,Taxonomic characters3rdTaxonomic procedure methods of insect collection, Kind of Types4thSteps of identification , Classification , Nomenclature and identification of insects and their relatives5thTaxonomic discrimination major types of variation , The international rules of zoological nomenclature6thStudy of insects Order , Subclass : Apterygota, Order :Collembola , Thysanura , Protura , Diplura7thSubclass: Pterygota , Order : Ephemeroptera,Orthoptera , Dictyoptera , Phasmida8thSubclass: Order : Odonata , Dermaptera , Isoptera9thOrder :, Hemiptera , Homoptera10thOrder : Anoplura , Mallophaga , Thysanoptera , Plecoptera11thOrder : Neuroptera , Siphonoptera , Mecoptera , Zoraptera12thOrder : Diptera , Coleoptera , Psocoptera13thOrder : Lepidoptera , Trichoptera,14thOrder Embioptera , Hymenoptera, 15thCollege of Prof. Dr. Nabeel AdulKadir Mawlood / LecturerCollege of Agriculture  Department of Plant Protection 2nd class

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| Subject  | Weeks  |
| Taxonomy , its history and function |  1St |
| kingdom of living organs ,characteristics and its Phylum , Phylum Arthropoda , Taxonomic key of Classes  | 2nd |
| The species , subspecies , and higher categories ,Taxonomic characters | 3rd |
| Taxonomic procedure methods of insect collection , Kind of Types, learning of key. | 4th |
| Steps of identification , Classification , Nomenclature and identification of insects and their relatives( Phylum : Arthropoda and classes ) 1st exam. | 5th6th |
| Taxonomic discrimination major types of variation , The international rules of zoological nomenclature | 7th |
| Classification of Insects; Study of insects Order , Subclass : Apterygota ,Order :Collembola , Thysanura , Protura , Diplura | 8th |
| Subclass: Pterygota , Order : Ephemeroptera ,Orthoptera , Dictyoptera , Phasmida | 9th |
| Subclass: Order : Odonata , Dermaptera , Isoptera | 10th |
| Order :, Hemiptera , Homoptera | 11th 2nd exam |
| Order : Anoplura , Mallophaga , Thysanoptera , Plecoptera | 12th |
| Order : Neuroptera , Siphonoptera , Mecoptera , Zoraptera | 13th |
| Order : Diptera , Coleoptera , Psocoptera | 14th |
| Order : Lepidoptera , Trichoptera, | 15th |
| Order Embioptera , Hymenoptera , | 16th |

Subject : Insect Taxonomy Year : 2015 - 2016  Marks of Spring Semester / 40% Marks Monthly Examinations No.101st exam / Theoretical 1 102nd exam / Theoretical 23Daily exam (quiz ) 32 Students reports 425Total / Theoretical 551st exam / practical 652nd exam / practical 75daily exams ++Reports Activity 815Total practical 940Grand tot | Lecturer's nameex:(2 hrs) |
| **18. Practical Topics (If there is any)** |  |
| In this course we will given an overview of insect taxonomy Lecture1: study the classification of living things. Lecture 2: Study the insect collection and preserving.Lecture 3: Definitions such as taxonomy, phylum, and each other... the principles of the classification of insect orders.Lecture 4 : visit to the field to survey insects.Lecture 5: study the order orthoptera and scientific classification and characteristics.Lecture 6: study the pterygota orders. Lecture 7: 1st practical examination.Lecture 8: study the order Hemiptera, scientific classification and other orders.Lecture 9: order Pthiroptera and study the characteristics.Lecture 10: study the order Coleoptera.Lecture 11 :study the order Hymenoptera (Wasps, Ants and Bees).Lecture 12 : visit to the field to survey insects. Lecture 13: 2nd examination.Lecture 14: study the order Diptera.Lecture 15: how to learn key of insect orders.Lecture 16 :Order Lepidoptera | Lecturer's nameHozan Qadir Hamamurad + Gazang Tahirex: (9 hrs)Ex: 5/2/2019 |
| **19. Examinations:****1. Multiple choices:****Q2 : Choose the correct terms from the brackets of the following sentences .** **Q 3: Enumerate the following ( Choose only Three ) .****Q4:Write the scientific name and the Order of the following .**

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| --- | --- | --- |
| **Order**  | **Scientific name**  | **Common name** |
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**Q5 : Formulate an appropriate taxonomic key for the identified the following :-****Orders of ClassInsecta .****Q6: Explain**  **Prof. Dr .NabeelA.Mawlood****Examinations:****Question sample:**1. Scientific classified of this order.
2. Write the parts that point.
3. Write the function of this parts.
4. Defined between this suborder.
5. What is the parts and give the examples.
6. Fell the blank.

**2. True or false type of exams:****3. Multiple choices:** |
| **20. Extra notes:** |
| **21. Peer reviewپێداچوونه‌وه‌ی هاوه‌ڵ** .‌‌  |

College of Agriculture –Subject :Insect Taxonomy

 Department of Plant Protection 2ndclassInsect Year : 2018 - 2019

2018 -2019 2ndSemester

References

1. Borrer , D.J and Delong , D. ( 1954 ) . An Introduction to the study of insects .Holt , Rinehart andWinston New york.

Chinery , M. ( 1982 ) . A Field guide to the Insect of Britain and Northern Europe . William Collins Sons

and Co. Ltd Glasgow .

Imm , A.D. ( 1964 ) . A General Textbook of Entomology .

Methuen and Co. LTD London .

Mayer , E. (1969 ) . Priciples of SystemsticsZoology . Tata

 McGraw – Hill Publishing Company LTD.

 Bombay – New Delhi .

Ross , H.H. ( 1948 ) . A Textbook of Entomology . John Wiley and Sons , Inc. New York .

Internet

I:\Insect classification.htm

J:\The History of Taxonomy eHow\_com.htm

J:\Systematics , taxonomy, classification.htm

J:\ Phylum Arthropoda mm.htm

 J:\ ArthropodaCharacteristics Tutorvista\_com.htm

I:\A Guide To arthropoda.htm

I:\Principles of systamatics.mht

I:\Principles of nomenclature of zoological taxa.mht