SYLLABUS

REGARDING THE QUALIFICATION CYCLE FROM 2021-2022 TO 2023-2024

1. BASIC COURSE/MODULE INFORMATION

Course/Module title	Insects in fossil record
Course/Module code *	
Faculty (name of the unit offering the field of study)	College of Natural Sciences
Name of the unit running the course	Institute of Biology and Biotechnology
Field of study	Biology
Qualification level	I degree
Profile	general academic
Study mode	stationary
Year and semester of studies	year II, sem. 3
Course type	Primary course
Language of instruction	English
Coordinator	dr hab. Iwona Kania-Kłosok, prof. UR
Course instructor	dr hab. Iwona Kania-Kłosok, prof. UR

* - as agreed at the faculty

1.1.Learning format – number of hours and ECTS credits

Semester (no.)	Lectures	Classes	Colloquia	Lab classes	Seminars	Practical classes	Internships	others	**ECTS credits**
3	6	15	3				6		2

1.2. Course delivery methods

- conducted in a traditional way
- involving distance education methods and techniques

1.3. Course/Module assessment (exam, pass with a grade, pass without a grade)

2. PREREQUISITES

Good communication, reading and writing English; high school zoology level.

3. Objectives, Learning Outcomes, Course Content, and Instructional Methods

3.1. Course/Module objectives

O1	- Explain and be able to discuss the processes of taphonomy, autotaphonomic, ecological, taphotopic, postburial, products of the taphonomic process.
O2	- Characterize different kinds of fossil resins of insects and chosen techniques used in palaeoentomology.
O3	- Explain dynamics of the insect taxonomic diversity; environments of insects based on selected examples.
O4	- Characterize morphology and phylogeny of selected groups of fossil insects.
O5	- Characterize examples of behavior of fossil insects preserved in amber.
O6	- Develop skills in performing collaborative research.

3.2. Course/Module Learning Outcomes (to be completed by the coordinator)

Learning Outcome	The description of the learning outcome defined for the course/module	Relation to the degree programme outcomes
LO_01	- students will be able to characterize the major types of fossil insects resins, the morphology and evolution of selected groups of fossil insects;	K_W01
LO_02	- students will understand the way and the directions of evolution in particular group of fossil insects, their morphology and taxonomy and the processes of taphonomy and fossilization;	K_W01
LO_03	- students will be able to perform basic assessment of the types of resins and recognize representatives of most common groups of insects preserved in fossil resins;	K_U04
LO_04	- students will be able to plan, establish and carry out experiments with application of taphonomy of insects in sediment;	K_U04
LO_05	- students will be able to carry out the biometric measurements of fossil insects with application of the basic techniques used in the paleoentomology;	K_U04

LO_06	- students will be able to develop skills in performing collaborative research;	K_K01

3.3. Course content (to be completed by the coordinator)

A. Lectures

Content outline
Types of fossil resins of insects, autotaphonomic, ecological, taphotopic, postburial, products of the taphonomic process: insects fossils in different paleoenvironments and modes of their preservation; marine deposits, non-marine subaquatic paleoenvironments; lacustrine deposits; swamp, marsh and other wetlands, fluvial, spring deposits, subaerial paleoenvironments. Morphology and phylogeny of selected groups of fossil insects.
Dynamics of the insect taxonomic diversity; environments of insect origin and early stages of evolution; origin of insects; evolution of selected group of insects with the particular references to the Diptera.
Evidence of relationships between ancient living insect organisms in different age of fossil resins.

B. Classes, tutorials/seminars, colloquia, laboratories, practical classes

Content outline
Insects fossilization; types of preservation; dating and ages; major fossil insects deposits; insects as contaminants in fossil assemblages; insect activities as a taphonomic factor. Chosen techniques used in palaeoentomology.
Different kinds of fossil resins, selected groups of insects in Mesozoic and Cenozoic resins; insect impression.
Insects in amber, insect taphonomy; direct burial in sedimentary deposits; autotaphonomic factors, ecological factors, ecological factors affecting organisms in their life-time; mortality factors; post-moderns ecological factors, taphotopic factors, technical factors.
Different kinds of fossil resins, selected groups of insects in Mesozoic and Cenozoic resins; inclusions of insects in amber.
Mutualism; ant and symbiotic scale insect; termite and cockroach gut mutualists; hickory aphid-leaves and aphid-plant relationships; symbiotic association traces in amber; traces behavior of insects in fossil resins; phoresy; camouflage; examples of autotomy of fossil insects; social insects in amber.

3.4. Methods of Instruction

e.g.

Lecture: a problem-solving lecture/a lecture supported by a multimedia presentation/ distance learning
Classes: text analysis and discussion/project work (research project, implementation project, practical project)/ group work (problem solving, case study, discussion)/didactic games/ distance learning
Laboratory classes: designing and conducting experiments

Lecture: Audio/video presentations.

Classes: practical laboratory work, discussion, deporting and presenting results.

4. Assessment techniques and criteria

4.1 Methods of evaluating learning outcomes

Learning outcome	Methods of assessment of learning outcomes (e.g. test, oral exam, written exam, project, report, observation during classes)	Learning format (lectures, classes,...)
LO-01-06	Lecture, audio/video presentations.	LECTURES
LO-01-06	Practical laboratory work, discussion, deporting and presenting results.	CLASSES

4.2 Course assessment criteria

Attendance is expected in all lectures, indoor workshop. Assessment for this course is carried out in many different ways. It takes into consideration both knowledge of the lecture but also critical thinking skills, technical skills, communication skills and collaborative skills.

5. Total student workload needed to achieve the intended learning outcomes – number of hours and ECTS credits

Activity	Number of hours
Scheduled course contact hours	21
Other contact hours involving the teacher (consultation hours, examinations)	9
Non-contact hours - student's own work (preparation for classes or examinations, projects, etc.)	15
Total number of hours	45
Total number of ECTS credits	2

* One ECTS point corresponds to 25-30 hours of total student workload

6. Internships related to the course/module

Number of hours	n.a.
Internship regulations and procedures	n.a.

7. Instructional materials

Compulsory literature:

- Boucot A.J., Poinar G.O. 2010. Fossil behavior compendium. CRC Press
- Grimaldi D., Engel M.S. 2005. Evolution of the insects. Cambridge University Press, Cambridge
- Kosmowska-Ceranowicz B. 2012. Amber in Poland and in the world. WUW, Warszawa
- Penney D., Jepson J.E. 2015. Fossil insects. An introduction to palaeoentomology. Siri Scientific Press, Manchester
- Rasnitsyn A.P., Quicke D.L.J. History of insects. Kluwer Academic Publishers, Dordrecht

Complementary literature:

- Martínez-Delclòs X.; Briggs D.E.G., Peñalver E. 2004. Taphonomy of insects in carbonates and amber. *Palaeogeography Palaeoclimatology Palaeoecology* 203: 19-64.
- Szwedo J., Sontag E. 2009. The traps of the 'amber trap'. Amber-trapped insects trap scientists with enigmas. In: Berning B., Podenas S. (Eds.), Amber: Archive of the deep time. *Denisia* 26: 155–169.
- Szwedo J., Sontag E. 2013. The flies (Diptera) say that amber from the Gulf of Gdańsk, Bitterfeld and Rovno is the same Baltic amber. *Polish Journal of Entomology* 82: 379-388.
- Kania I., Wegierek P. 2008. Palaeoaphididae (Hemiptera, Sternorrhyncha) from Lower Cretaceous Baissa deposits. Morphology and classification. Instytut Systematyki i Ewolucji Zwierząt, Polska Akademia Nauk, Kraków. *Monografie faunistyczne*, 25: 132.

Approved by the Head of the Department or an authorised person