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**Department of …Geology…………………….**

**College of …Science…………………………….**

**University of Salahaddin………………………….**

**Subject: ……Micropaleontology…………………………….**

**Course Book – (Year 3)**

**Lecturer's name Mr. Irfan Shaaban Asaad**

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | **Micropaleontology** |
| **2. Lecturer**  | **Irfan Shaaban Asaad**  |
| **3. Department/ College** | **Earth Sciences and Petroleum / Science** |
| **4. Contact** | **Irfan.asaad@su.edu.krd****07504621348** |
| **5. Time (in hours) per week**  | **Practical: 8**  |
| **6. Office hours** | **Sunday, Tuesday & Wednesday 8 hours**  |
| **7. Course code** |  |
| **8. Teacher's academic profile**  | **BSc 2007, MSc 2019, both at the College of Science, Salahaddin University; Assistant Lecturer 2020**  |
| **9. Keywords** |  |
| **10. Course overview:** This subject deals with the nature of microfossils; hence its main concern is the specimen as seen down the microscope, considered as a once-living organism. The naming of parts, which is the first essential step, precedes the naming and classification of the specimen, in which a number of genera are described briefly and accompanied by labelled line drawings such as the student, may prepare himself. More derivative data, as for the general history of a group, are broadly sketched but the all-important matter of their geological applications is covered for each group in the form of an “animated” reference list, turning students towards books or articles of special interest.We envisioned a college-level introductory text, including all microfossil groups used in the study of the marine environment. We hoped to provide a source for basic information on each group, for comprehension of the type of reasoning applied to the study of microfossils and their use in (paleo)oceanography, and for locating essential background material and references necessary to pursue any group further.As recent advances in micropaleontology continue to transform what was predominantly a descriptive to a more interpretive science vital to (paleo)oceanography research, the number of researchers interested in its applications, especially in the age determination of sediments has increased. Thus, in several graduate schools of Earth Sciences and Oceanography, Micropaleontology is a course required of all students. We hope that, in addition to the beginning students of micropaleontology, non-micropalaeontologists (e.g.  Sedimentologists, core-describers, shipboard geophysicists) may produce reasonable estimates of the age of sediments from the stratigraphic range-charts. |
| **11. Course objective:**By definition **micropaleontology**,the study of microscopic fossils, cuts across many classificatory lines. It includes within its domain the study of large numbers of taxonomically unrelated groups united solely by the fact that they must be examined with a microscope. At the same time within certain taxonomically homogeneous groups the size of some forms is such that they scarcely need be examined with microscopic aid and are more properly grouped under micropaleontology. It is not surprising then that as a discipline micropaleontology lacks a certain coherent homogeneity. Most marine microfossils are protists (unicellular plants and animals); but others are multicellular or microscopic parts of macroscopic forms.The practical value of marine microfossils in various fields of historical geology is enhanced by their minute size, abundant occurrence and wide geographic distribution in sediments of all ages and in almost all marine environments. Due to their small size and large numerical abundance, relatively small sediment samples can usually yield enough data for the application of more rigorous quantitative methods of analysis.  |
| * **12. Student's obligation** Always, be present in the hall before the instructor
* You must close mobile before entering the hall
* You must be ready to hear the lecture
* You must sit down and don’t talk especially during explanation
* You must discuss and ask about all information that you can’t understand
* Always, you must read the required or text books to compare with lecture that you receive

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| * **13. Forms of teaching**
* Power Point presentations
* Explanations on blackboard
* Classroom discussions
* Polarized and Binocular Microscope (practical part)
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| **14. Assessment scheme** Practical part equals **35%;** this degree will be approached byat least one examination in addition to quizzes plus the degree of the scientific trip. Sometimes the activity of the students within the classroom is evaluated and counted with the above-mentioned degree.  Final Examination: **50% only theoretical** **In addition to the above-mentioned gradings, we have many different quizzes during some the lecture time. The most important thing to evaluate the levels of students, is the scientific trip which deserves report of 100%.**‌ |
| **15. Student learning outcome:**s followed the oil companies those work in the Kurdistan Region especially in the‌Most of the graduated student  |
| **16. Course Reading List and References‌:** **Main Text Books**Haq,B.U.and Boersma,A.,1978 : Introduction to marine micropaleontology.Elsevier. New York.376p.Brasier, M.D.,1980: Microfossils. George Allen and Unwin. London, Boston, Sydney.193p.Bignot, G.,1985: Elements of micropalaeontology. Graham and Trotman.217p.Armstrong,H.A. and Brasier,M.D.,2005: Microfossils (Second Edition).Blackwell Publishing.296p.  **Additional References**Loeblich,A.and Tappan,H.,1964: Sarcodina,Chiefly “Thecamoebians” and Foraminiferida.In Moore,R.C.(ed.),Treatise on Invertebrate Paleontology. Geol.Soc.Amer.and Univ.Kansas,part C,Protista 2(1,2).C1-C900.Banner,F.T.and Lord,A.R.,1982: Aspects of micropaleontology. George Allen and Unwin.London, Boston, Sydney.324p.   **Journals and Bulletins**MicropaleontologyMarine MicropaleontologyBull.Utrecht MicropaleontologyJournal of PaleontologyProceedings.Kon.Ned.Akad.Wet.Contribution of Cushman Foundation of Foraminiferal ResearchJournal of Foraminiferal ResearchBull.American Association of Petroleum GeologistsMarine GeologyBull.Geological Society of AmericaAmerican Journal of SciencePalaeogeography,Palaeoclimatology,PalaeoecologyJournal of Sedimentary PetrologyJournal of Geology, Nature, Proceedings of the Conferences |
| **17. The Topics:** | **Lecturer's name** |
|  **Course Program****Week 1 – Sample preparation**  Using traditional techniques for preparing and extracting microfossils especially mineral walled microfossils. **Week 2,3,4 & 5- Foraminifera**Identifying nearly thirty genera of foraminifera. This will be by the following requirements:  Test morphology; General description of the foraminiferal test: 1. Wall structure 2. Overall shape 3. Shape and arrangement of chambers 4. Apertures 5. Sutures 6. Ornamentation; Evolution lines of Foraminifera and Classification.**Week 6 – Ostracods**Systematic position  Ostracoda; General characters; Hard parts; Ostracod carapace (inner lamella-outer lamella), Muscle scars; Hingement, different types; Orientation of the carapace (Anterior and Posterior,Dorsal and Ventral); and Bases of classification.**Week 7– First Examination****Week 8, 9- Spores and Pollen**Introduction; Palynology- definition, groups, importance; Pollen;Spores; Morphology, Distinguishing criteria for pollen (size, shape,apertures, sculpture, wall structure),Spore characteristics( basicshape, size, apertures,wall structures, sculpture.**Week 10- Group Acritarcha**Introduction; Nature and systematic of the Acritarchs; Main characteristics; Morphology(Main parts of the standard shape ofAcritarchs, The Vesicle);Different groups of Acritarch according toThe shape and symmetry of body; Wall structures (cross sectionsin Acritarch genera to show different shapes of the wall); Types of Processes; Types of Central body; Main parts of standard Process in Acritarch (Base, Cavities, Stem, Tips, Branching); Ornamentation; Classification, Bases; Important criteria for defining species and genera, **Week 11 – Field trip samples**In this week we are going to direct students to work on the prepared and extracted fossils from the field samples. This samples have been collected for educational purposes. At the end of the course there will be a report and PowerPoint presentation for each group of students showing different fossils. The fossils have been extracted in the field for aging the stratigraphic successions.  | **Mr. Irfan Shaaban (8 hrs)**  |
| **12. Examinations:** beside the dates that have been limited for monthly examinations we have decided to show some examples of exam questions.1- Acritarchs are the primary producers of the Proterozoic and Palaeozoic. Explain briefly? 2- The chemical signals are useful parameters when extracted from the CaCO3 in a mass spectrometer.3- Some features make spore and pollen grains valuable to biostratigraphy. Explain? 4- The reproductive system of the ostracod is highly developed. Explain? 5-What are the main uses of adult/juvenile ratios in ostracods?6-Explain and draw the distribution of the water masses in the modern oceans.**There are also some examples for true and false, as in below:** 1-Ostracods are one of the most diverse groups of living crustaceans. 2-The adductor musclesclose the valves and form the central muscle-scarpattern on the valves. 3-*Histrcosporites* belongs to Subturma Zonolaminatitriletes. 4-Cypris live in hypersaline lagoon environment.5-The aperture in pollen grains is usually long trilete laesurae.6-The level in the water column at which CaCO3 solution equals CaCO3 supply is called the calcium carbonate compensation depth(or CCD). 7-The depth distribution of living larger benthic foraminiferal taxa is closely related to the light wave lengths required by their symbionts. 8-The acritarch wall consists of a complex of polymers known as sporopollenin. 9-In the prasinophytes and *Baltisphaeridium* the vesicle ultrastructure comprises a double layer. 10- *Micrhystridium* has a spherical central body >40 μm in diameter with simple processes. 23 |
| **20. Extra notes: No** |
| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ** **Dr. Ali Ashur Abd**  |

