COURSE DESCRIPTION

Biostratigraphy

Academic year 2026-2027

1. Programme-related data

1.1. Higher Education Institution	Babeș-Bolyai University	
1.2. Faculty	Faculty of Biology and Geology	
1.3. Department	Department of Geology	
1.4. Field	Geology	
1.5. Level of study	Master	
1.6. Degree programme / Qualification	Geology of Energy Resources	
1.7. Form of education	With frequency	

2. Course-related data

2.1. Course title	**Biostratigraphy**			Course code	**BME1113**
2.2. Course coordinator	Dr. Raluca Haitonic, Lecturer Dr. Lóránd Silye, Assoc. Prof. Dr. George Pleș, Lecturer Dr. Carmen Chira, Assoc. Prof. Dr. Szabolcs Kövecsi, Lecturer Dr. Ioan Tanțău, Prof. Dr. Ioan Bucur, Prof. Dr. Sorin Filipescu, Prof.				
2.3. Seminar coordinator	Dr. Raluca Haitonic, Lecturer Dr. Lóránd Silye, Assoc. Prof. Dr. George Pleș, Lecturer				
2.4. Year of study	1	2.5. Semester	1	2.6. Type of assessment	Exam
2.7. Course status	Compulsory			2.8. Course type	Specialisation subject

3. Total estimated time (hours per semester of teaching activities)

3.1. Number of hours per week	**4**	of which: 3.2. course	**2**	3.3. seminar/ laboratory/ project	**2**
3.4. Total of hours in the curriculum	56	of which: 3.5. course	28	3.6. seminar/ laboratory	**28**
Time allocation for individual study (IS) and self-taught activities (ST)					**hours**
Learning from textbooks, course materials, bibliography, and notes (IS)					30
Additional research in the library, on subject-specific electronic platforms, and on-site					30
Preparing seminars/ laboratories/ projects, assignments, reports, portfolios, and essays					20
Tutoring (professional guidance)					10
Examinations					4
Other activities					
3.7. Total hours of individual study (IS) and self-taught activities (ST)				**94**	
3.8. Total hours per semester				**150**	
3.9. Number of credits				**6**	

4. Prerequisites (where applicable)

4.1. curriculum-related	Prior acquisition of basic knowledge in the field of sedimentary geology	
4.2 skills-related	Use of microscope and computer	

5. Specific conditions (where applicable)

5.1. course-related	Video logistical support; active-participatory methods; examples.	
5.2. seminar/laboratory-related	Participation in at least 70% of the practical work is a requirement for taking the exam.	

6.1. Competencies resulting from the completion of the degree programme *(as referred to in the curriculum)*

Professional competencies	
Competency code	**Competency**
PC1	Applies geological, geochemical and geophysical knowledge in order to characterise and evaluate the energetical resources.
PC2	Uses information tools and other digital instruments for hydrocarbon and mineral resource exploration.
PC3	Performs laboratory analyses and interprets results in order to evaluate the energetic resources.
PC4	Analyses complex problems in the field of energetic resource exploration.
PC5	Writes technical reports and scientific papers within multidisciplinary teams.
Transversal competencies	
Competency code	**Competency**
TC1	Communicates efficiently technical and scientific information
TC2	Works efficiently in multidisciplinary teams in order to achieve the common objectives

6.2. Learning outcomes relevant to the degree programme

Learning outcomes targeted by the subject		
Competency code	**Knowledge and comprehension**	**Specific academic skills**
PC1	1. Understands concepts required to analyse complex problems.	1. Identifies, and analyses complex problems in energetic resource exploration using scientific and digital methods
PC2	2. Knows the structure, rules, and standards for writing technical reports and scientific papers, as well as principles of interdisciplinary collaboration.	2. Writes technical reports and scientific papers within multidisciplinary teams, integrating contributions from different fields.
PC3	3. Knows the principles of teamwork, professional roles, and collaboration dynamics in multidisciplinary teams.	3. Works effectively in multidisciplinary teams, communicating clearly and actively contributing to the achievement of common goals

7. Subject-specific learning outcomes

Knowledge and comprehension
1. The ability to identify significant microfossils and dating various sedimentary deposits.
2. Ability to interpret the indirect information used in biostratigraphy, provided by paleoecology, paleobiogeography, and paleoclimatology.
3. The possibility to evaluate determined associations in a paleoecological context.
4. The possibility to use the data in practical studies on deposits with significance for hydrocarbon exploration.
5. Ability to write reports and scientific papers.
Specific academic skills
1. The student is able to genera and species of microfossils important for dating sedimentary sequences.

2. Able to collect and prepare micropaleontological material from different rocks (shales, carbonates, peat-bogs, etc.) for microscope analysis.
3. The student has the ability to work independently to analyse micropaleontological material using fast analytical methods (e.g., optical microscopy). Thus, the student will be able to identify the main diagnostic features characteristic of different genera/species of biostratigraphically important microfossils.

8. Contents

8.1. Course	**Teaching and learning methods**	**Remarks**
Course 1. Foraminifera and ostracoda. General characteristics.	Presentation, discussions, case studies	
Course 2. Agglutinated foraminifera.	Presentation, discussions, case studies	
Course 3. Small calcareous benthic foraminifera.	Presentation, discussions, case studies	
Course 4. Large benthic foraminifera.	Presentation, discussions, case studies	
Course 5. Planktonic foraminifera.	Presentation, discussions, case studies	
Course 6. Ostracoda.	Presentation, discussions, case studies	
Course 7. Calcareous nannoplankton. General characteristics.	Presentation, discussions, case studies	
Course 8. Calcareous nannofossils biostratigraphy throughout Cretaceous and Cenozic.	Presentation, discussions, case studies	
Course 9. Microbialites and calcareous green algae. General characteristics.	Presentation, discussions, case studies	
Course 10. Red algae. General characteristics.	Presentation, discussions, case studies	
Course 11. Calpionellids. General characteristics.	Presentation, discussions, case studies	
Course 12. Calpionellid biozones.	Presentation, discussions, case studies	
Course 13. Palynology: introduction, groups of palynomorphs, Dinoflagellates and Chitinozoa.	Presentation, discussions, case studies	
Course 14. Palynology: pollen and spores.	Presentation, discussions, case studies	

Bibliography

1. Foraminifera and ostracoda:

- Armstrong, H.A., Brasier, M.D., 2005. **Microfossils**. 296 p. Blackwell Publishing.
- Cicha, I., Rögl, F., Rupp, Ch., Ctyroka, J., 1998. **Oligocene–Miocene Foraminifera of the Central Paratethys**. Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft, 549 pp.
- Gross, M., 2006. **Middle Miocene Ostracods from the Vienna Basin (Badenian/Sarmatian, Austria)**. Österreichische Akademie der Wissenschaften, Schriftenreihe der Erdwissenschaftlichen Kommissionen, v. Sonderband 1. Verlag Österreichische Akademie der Wissenschaften, Wien, 224 pp., (in German).
- Hottinger, L., 1974. **Alveolinids, Cretaceous-Tertiery larger Foraminifera**. Esso Production Research-European Laboratories.
- Kaminski, M.A., Gradstein, F.M. and collaborators, 2005. **Atlas of Paleogene Deep Water Agglutinated Foraminifera**. 547 p.
- Kennett, J.P., Srinivasan, M.S., 1983. **Neogene Planktonic Foraminifera**. A Phylogenetic Atlas. 265 p. Hutchinson Ross Publ. Co. Stroudsburg.
- Less, G., 1987. **Paleontology and stratigraphy of the European Orthophragminae**. Geol Hung Palaeontol, 51:1-373.
- Loeblich, A., Tappan, H., 1964. **Protista**. In Moore, R.C.: Treatise on Invertebrate Paleontology, Part C 2/1-2, 900 p. Kansas Univ. Press.

- Loeblich, A., Tappan, H., 1988. **Foraminiferal genera and their classification**. 2 vol. Van Nostrand Reinhold Co. New York.
- Popescu, G., 1975. **Études des foraminiféres du Miocène inférieur et moyen du nordouest de la Transylvanie**. Mémoires, Institut de Géologieet de Géophysique, 23, 121 pp.
- Schaub, H., 1981. **Nummulites et Assilines de la Téthys Paléogène**. 238 p. Mémoires suisses de Paléontologie.

2. Calcareous nannofossils:

- Chira, C., 2000. **Nannoplancton calcaros şi moluşte miocene din Transilvania**, România. Ed. Carpatica, 183 p., 21 fig., 8 tab., 20 pl., Cluj-Napoca.
- Martini, E., 1971. **Standard Tertiary and Quaternary Calcareous Nannoplancton Zonation**. Proceed. of the II Planktonik Conference, p. 739 - 785, Roma (1970).
- Mészáros, N., and collaborators, 1991. Curs de nannoplancton. Univ. Babeş-Bolyai, 138 p., Cluj-Napoca.
- Okada, H., Bukry, D., 1980. **Supplimentary modifications and introduction of code numbers to the latitude coccolith biostratigraphic zonation**. D.S.D.P., 20, p. 355 - 374.

3. Microbialites, green and red algae:

- Berger, S., Kaever, M.J., 1992. **Dasycladales. An illustrated monograph of a fascinating algal order**. 247 p., G. Thieme Verlag, Stuttgart.
- Dragastan, O., 1980. **Alge calcaroase din Mezozoicul şi Terţiarul României**. 167 pag., 115 figs., 20 pls., Ed. Acad. RSR, Bucureşti.
- Riding, R., 2000. **Microbial carbonates: the geological record of calcified bacterial-algal mats and biofilms**. Sediment 47, 179–214.
- Braga, J.C., Vescogni, A., Bosellini, F.R., Aguirre, J., 2009. **Coralline algae (Corallinales, Rhodophyta) in western and central Mediter-ranean Messinian reefs**. Palæogeography, Palæoclimatology, Palæoecology, vol. 275, no. 1-4, p. 113-128.

4. Calpionellids:

- Bucur, I.I., 1992. **Calpionellids and calcispheres from the Upper Jurassic-Lower Cretaceous deposits in the Resita-Moldova Noua zone, Southern Carpathians, Romania**. Creatceous Research 13: 565-576.
- Pop, G., 1974. **Les zones des calpionellides tithoniques-valanginiennes du sillon de Resita (Carpathes Meridionales)**. Revue Roumaine de Geologic 18: 109-125.
- Pop, G., 1986. **Calpionellids and correlation of Tithonian-Valanginian formations**. Acta Geologica Hungarica 29: 93-102.

6. Palynology:

- Traverse, A., 2007. **Paleopalynology**. Topics in Geobiology, second ed. Springer, Dordrecht, Netherlands.
- Tyson, R.V., 1995. **Sedimentary Organic Matter: Organic facies and palynofacies**. Chapman and Hall, London.
- Vandenbroucke, M., Largeau, C., 2007. **Kerogen origin, evolution and structure**. Organic Geochemistry, 38, 719–833.

* ***All of these references can be found at the Department of Geology Library (1 M. Kogălniceanu street)***

8.2. Seminar/ laboratory	**Teaching and learning methods**	**Remarks**
1. Visit to the micropaleontological sample preparation laboratory (preparation techniques, selection, and analysis of microfossils)	Discussions, case studies, microscope investigatons	
2. Agglutinated foraminifera (general characteristics, biozonation), microscope analysis, case studies.	Discussions, case studies, microscope investigatons	
3. Small calcareous benthic foraminifera (general characteristics, biozonation), microscope analysis, case studies.	Discussions, case studies, microscope investigatons	
4. Large calcareous benthic foraminifera (general characteristics, biozonation),	Discussions, case studies, microscopy	

macroscopic and microscopic analysis, case studies.		
5. Planktonic foraminifera (general characteristics, biozonation), microscope analysis, case studies.	Discussions, case studies, microscopy	
6. Ostracoda (general characteristics, biozonation), microscopic analysis, case studies.	Discussions, case studies, microscopy	
7. Calcareous nannoplankton (key features, optical microscopy, biozones).	Discussions, case studies, microscopy	
8. Calcareous nannoplankton (case studies).	Discussions, case studies, microscopy	
9. Microbialites and green algae (microbial products, calcified cyanobacteria, Halimedaceae, Dasycladales).	Discussions, case studies, microscopy	
10. Red algae (Solenoporaceae, Peyssonneliaceae, Corallinaceae).	Discussions, case studies, microscopy	
11. Calpionellids (general characteristics, biozones, microscopic investigations).	Discussions, case studies, microscopy	
12. Calpionellids (case studies from the Romanian Carpathians).	Discussions, case studies, microscopy	
13. Palynology. Dinoflagellates and Chitinozoa (general characteristics, optical microscopy).	Discussions, case studies, microscopy	
14. Palynology. Pollen and spores (optical microscopy, case studies).	Discussions, case studies, microscopy	
Bibliography The same as those for the course.		

9. Evaluation

Type of activity	9.1 Evaluation criteria	9.2 Evaluation methods	9.3 Percentage in the final grade
9.4. Course	Assessment of knowledge	Written exam	50%
9.5. Seminar/ laboratory	Activity during lab sessions; assessment of knowledge	Practical test	50%
9.6 Minimum standard for passing			
• 50% of the subjects required by the written exam: • 50% of the practical test			

10. SDG labels (Sustainable Development Goals)

Date of entry: 03.04.2026	Signature of course coordinator Șef. lucr. Dr. George Pleș	Signature of seminar coordinator Șef. lucr. Dr. George Pleș

Date of approval in the department: 27.04.2026	Signature of the head of department Conf. dr. Nicolae Har