

ACADEMIC COURSE DESCRIPTION – BIOSTRATIGRAPHY AND PALEOECOLOGY. PRACTICAL APPLICATIONS IN HYDROCARBON RESEARCH

MASTER'S DEGREE
WELL GEOLOGY
 1ST YEAR OF STUDY, 1ST SEMESTER

COURSE TITLE	BIOSTRATIGRAPHY AND PALEOECOLOGY. PRACTICAL APPLICATIONS IN HYDROCARBON RESEARCH
COURSE CODE	31120120010PM1211101
COURSE TYPE	full attendance
COURSE LEVEL	2 nd cycle (master's degree)
YEAR OF STUDY, SEMESTER	1 st year of study, 1 st semester
NUMBER OF ECTS CREDITS	8
NUMBER OF HOURS PER WEEK	4 (2 lecture hours + 2 seminar hours)
NAME OF LECTURE HOLDER	Assistant Professor Paul Țibuleac
NAME OF SEMINAR HOLDER	Assistant Professor Paul Țibuleac
PREREQUISITES	Paleontology, Structural Geology, Sedimentary Petrology
A	GENERAL AND COURSE-SPECIFIC COMPETENCES
	<p>General competences:</p> <ul style="list-style-type: none"> → Effectively using additional sources and assisted learning resources in order to devise a research paper on a topic pertaining to the academic discipline → Improving teamwork abilities within a research team <p>Course-specific competences:</p> <ul style="list-style-type: none"> → Using the index taxa from fossil assemblages for the relative dating of deposits from outcrops and wells (age, the identification of discontinuities, hardgrounds); using the faunal particularities of different regions as arguments for the tracing and evolution of paleogeographic provinces → Inferring the main characteristics of paleoenvironments based on the information provided by fossil assemblages (depth, salinity, currents etc.) → Correlating the biostratigraphic and paleoecological information with the lithological and technical data available for wells in order to characterize a structural unit (including reservoir rocks or source rocks)
B	LEARNING OUTCOMES
	<p>Upon completing the discipline, students become capable of:</p> <ul style="list-style-type: none"> → using index taxa for the correlation of deposits from outcrops and wells from structural units with different tectonic regimes; → suggesting various types of biozones based on the fossil assemblages from outcrops and wells → using the biostratigraphic and paleoecological significance of fossil assemblages in the correlation of similar deposits from different structural units/provinces → identifying fossils with paleoecological significance and describing the main characteristics of a paleoenvironment based on the fossil assemblages encountered → statistically interpreting paleontological samples
C	LECTURE CONTENT

Week	Title of lecture	Teaching methods	Duration
1	The appearance of life. Evolutionary theory versus creationism. Biodiversity and extinction in the history of life	Lecture-debate	4 hours
4	The first organisms – Archaeobacteria and Eubacteria (Warrawoona –Australia). Snowball Earth, Ediacara fauna	Lecture-debate	2 hours
5	Cambrian – Paleogeography. "Small shelly fauna," the fauna from Chengjiang (China) and the Burgess Shale (Canada). Biozones and subdivisions	Lecture-debate	4 hours
6	Ordovician – Paleogeography. The adaptive radiation of the Ordovician. Events in the evolution of life (the Ordovician extinction). Biozones and subdivisions	Lecture	2 hours
8	Silurian – Paleogeography. Events in the evolution of life (e.g. the appearance of terrestrial life). Biozones and subdivisions	Lecture. Demonstration	2 hours
9	Devonian – Paleogeography. Events in the evolution of life. Biozones and subdivisions	Lecture	2 hours
10	Carboniferous – Paleogeography. The development of flora and fauna. Events in the evolution of life. Biozones and subdivisions	Lecture	2 hours
11	Permian – Paleogeography. The Permian-Triassic mass extinction. Events in the evolution of life. Biozones and subdivisions	Lecture. Demonstration.	2 hours
12	Jurassic – Paleogeography. Events in the evolution of life (minor extinctions). Biozones and subdivisions	Lecture-debate	2 hours
13	Cretaceous – Paleogeography. The Cretaceous-Paleogene extinction. Events in the evolution of life (minor extinctions). Biozones and	Lecture-debate	2 hours

		subdivisions		
	14	Cenozoic – Paleogeography. Events in the evolution of life (minor extinctions). Biozones and subdivisions	Lecture-debate	2 hours
D RECOMMENDED READING FOR LECTURES				
<p>Main references: Salvador. A. (ed.),1994.International Stratigraphic Guide. Țibuleac P. Course Notes.</p> <p>Additional references: Benton, M. J. 2001. Biodiversity on land and sea. <i>Geological Journal</i>, 36: 211-230. Brenchley, P. J., Harper, D. A. 1998. Palaeoecology: Ecosystems, Environments and Evolution. <i>Chapman & Hall</i>, 402 pp. Dhondt A. V., Dieni, I. 1996. Synecology of an unusual Late Cretaceous inoceramid-spondylid association from northern Italy. <i>Ann. Muz. Civ. Rovereto</i>, 11(1995): 327-338. Peter, A., A., Bottjer, D., J. (eds.) Taphonomy: Bias a process through time. <i>Topics in Geology</i>, vol. 32, chapter I, 17 pp. Twitchett, R. J., Wignall, P. B., Benton, M., J. 2000. Discussion on Lazarus taxa and fossil abundance at times of biotic crisis. <i>Journal of the Geological Society</i>, London, 157: 511-512. Wright, N., Zahirovic, S. Müller, R., D., Seton, M. 2013. Towards community-driven paleogeographic reconstructions: Integrating open-access paleogeographic and paleobiology data with plate tectonics. <i>Biogeosciences</i>, 10: 1529-1541.</p>				
E SEMINAR CONTENT				
	Week	Title of seminar	Teaching methods	Duration
	1	The establishing of biostratigraphic units based on fossil assemblages. Index fossils and facies fossils. The International Stratigraphic Guide, 1994. The biostratigraphic description of a sector from a structural unit.	Demonstration. Application. Problematization	4 hours
	2	The analysis of macro- and micropaleontological samples	Application	4 hours
	3	Fieldwork (at Frasin, according to the agreement with S.C. Daflog SRL Medias or on the deposits of the Moldavian Platform)	Demonstration	8 hours
	5	Reconstructing paleoenvironments based on benthic foraminifera	Demonstration. Application.	4 hours
	6	Using the planktonic/benthic foraminifera ratio in reconstructing paleoenvironments	Demonstration. Application. Problematization.	2 hours
	7	Reconstructing paleoenvironments based on bryozoa	Demonstration. Application. Problematization.	2 hours

	8	Reconstructing the sectors of carbonate platform based on fossil assemblages/bioclasts	Demonstration. Application. Problematization.	4 hours
F	RECOMMENDED READING FOR SEMINARS			
	<p>Barattolo, F., Pugliese, A., E. 1987. Il Mesozoico dell isola di Capri. <i>Accademia Pontaniana</i>, 172 p.</p> <p>Flügel, E. 2010. <i>Microfacies of carbonate rocks</i>. Springer Heidelberg Dordrecht London New York, 984 p.</p> <p>Jones, R. W., Wonders, A. A. H., 1992. Benthic foraminifers and paleobathymetry of Barrow Group (Berriasian-Valanginian deltaic sequence, sites 76 and 763 Northwest shelf). <i>Proceedings of the Ocean Drilling Program, Scientific Results</i>, vol. 122.</p> <p>Moissette P., Dulai, A., Escarguel, G., Kázmér, M., Müller, P., Saint Martin, J.-P., 2007. Mosaic of environments recorded by bryozoan faunas from the Middle Miocene of Hungary. <i>Paleogeography, Palaeoclimatology, Paleoecology</i>, 252, 530-556.</p> <p>Salvador. A. (ed.), 1994. <i>International Stratigraphic Guide</i>.</p>			
G	EDUCATION STYLE			
	LEARNING AND TEACHING METHODS	Lecture-debate, demonstration, application, problematization		
	ASSESSMENT METHODS	Ora assessment and research paper (lecture) – 70%, practical assessment and portfolio (seminar) – 30%		
	LANGUAGE OF INSTRUCTION	English		