



ANALYSIS OF PETROLEUM SYSTEMS, PROSPECT EVALUATION

Petroleum Geoscience MSc course

2022/23 2. Semester

COURSE COMMUNICATION FOLDER

University of Miskolc
Faculty of Earth and Environmental Sciences and Engineering
Institute of Exploration Geosciences

Course datasheet

Course Title: Analysis of petroleum systems, prospect evaluation	Credits: 2
Type (lec. / sem. / lab. / consult.) and Number of Contact Hours per Week: sem. 2	
Neptun code: MFFAT730003	
Type of Assessment (exam. / pr. mark. / other): pr. mark	
Grading limits: >80%: excellent, 70-80%: good, 60-70%: medium, 50-60%: satisfactory, <50%: unsatisfactory.	
Position in Curriculum (which semester): second	
Pre-requisites (<i>if any</i>):	
Course Description:	
Acquired store of learning: <u>Study goals:</u> <u>Course content:</u> This topic presents a modern approach to the analysis of sedimentary basins, emphasizing the fundamental controls on basin development. The mechanisms controlling large-scale basin evolution are integrated with structural evolution and sedimentary processes. Analysis techniques include quantitative geophysical modelling, seismic interpretation and detailed sedimentary and stratigraphic analysis of basin infill. Fundamentals of play-based exploration aimed at demonstrating the integration of all aspects of petroleum exploration and petroleum systems analysis. The course includes seismic interpretation, well correlation and common risk segment mapping and the integration of reservoir, source, seal and trap analysis. Prospect and play risk analysis is also outlined as a basis for generating a consistent approach to estimating risked volumetric estimations. This course is deliberately practical and is used as a precursor to the annual European Heath of the Imperial Barrel Award competition (AAPG). <u>Education method:</u> Lectures with ppt presentation, prospect resource estimation&analysis practicing <u>Competencies to evolve:</u> <ul style="list-style-type: none">• Educating complex geological and geophysical modelling works and by joining with the quality management system.• Ability to control the complex planning works of hydrocarbon exploration as well as conducting and participating in project management tasks.• Ability to explore hydrocarbon-bearing geological structures in a workmanlike manner and to evaluate sedimentary basins in hydrocarbon perspective.• Ability to enumerate the hydrocarbon resource qualitatively and quantitatively and make technical evaluation.• Ability to analyse the geological and geophysical conditions of hydrocarbon reservoirs, to prepare exploration and technical operation plans, to perform the exploration work technically and to control that, to prepare and review (final) reports.• Ability to understand and define geological probability of the petroleum play and prospect.• Ability to participate in solving geological and geophysical problems arising in hydrocarbon mining (planning, investment, maintenance, abandonment), and to analyse the possible solutions for the above purposes.• Intuition, systematism, learning skill.• Demand for continual renewal of technical skills.	

The 3-5 most important compulsory, or recommended **literature** (textbook, book) **resources**:

- Allen&Allen 1990: Basin analysis, Principles and Applications.
- Bjorlykke, K., 2010: Petroleum Geoscience. From Rock Sediementary Environments to Rock Physics. Springer Verlag
- Magoon, L.B., Dow W.G., 1994: The Petroleum System – From Source to Trap. In AAPG Memoir 60, p. 3-24
- Otis, R.M., Schneidermann, N., 1997: A Process for Evaluating Exploration Prospects. In AAPG Bulletin, Vol. 81, No.7, p. 1087-1109
- Rose, P.R., 2001: Risk Analyses and Management of Petroleum Exploration Ventures. In AAPG Methods in Exploration Series No. 12
- Shell, 2004: Play Based Exploration Guide
- Tissot, B.P & Welte, D.H. 1978: Petroleum Formation and Occurrence. A new Approach to Oil and Gas Exploration. Springer-Verlag

Responsible Instructor(*name, position, scientific degree*):

Károly Kiss, assistant lecturer (University of Miskolc)

Other Faculty Member(s) Involved in Teaching, if any (*name, position, scientific degree*):

Ahmed Amran Dr., PhD (MOL Group)

Syllabus of the semester

Monday, 12:00 – 14:00

<i>Date</i>	<i>Practical</i>
2023.02.27.	This topic presents a modern approach to the analysis of sedimentary basins, emphasizing the fundamental controls on basin development.
2023.03.06.	The mechanisms controlling large-scale basin evolution are integrated with structural evolution and sedimentary processes.
2023.03.13.	The mechanisms controlling large-scale basin evolution are integrated with structural evolution and sedimentary processes.
2023.03.20.	Analysis techniques include quantitative geophysical modelling, seismic interpretation and detailed sedimentary and stratigraphic analysis of basin infill.
2023.03.27.	Analysis techniques include quantitative geophysical modelling, seismic interpretation and detailed sedimentary and stratigraphic analysis of basin infill.
2023.04.03.	Fundamentals of play-based exploration aimed at demonstrating the integration of all aspects of petroleum exploration and petroleum systems analysis.
2023.04.10.	Holiday
2023.04.17.	Fundamentals of play-based exploration aimed at demonstrating the integration of all aspects of petroleum exploration and petroleum systems analysis.
2023.04.25.	The course includes seismic interpretation, well correlation and common risk segment mapping and the integration of reservoir, source, seal and trap analysis.
2023.05.01.	Holiday
2023.05.08.	The course includes seismic interpretation, well correlation and common risk segment mapping and the integration of reservoir, source, seal and trap analysis.
2023.05.15.	Prospect and play risk analysis is also outlined as a basis for generating a consistent approach to estimating risked volumetric estimations.
2023.05.22.	This course is deliberately practical and is used as a precursor to the annual European Heath of the Imperial Barrel Award competition (AAPG).
2023.05.29.	Holiday

Assessment

There is assessment at the end of the course in written form. The test consists of two parts, definitions and essay questions.

Definition samples:

(Five shall be asked in the Test. One or two sentence short answer is expected for each.)

Play	Favourable spatial and timely coincidence of petroleum generation, migration, and entrapment, resulting in the group of producing fields and identified but not yet produced accumulations that follow similar and stratigraphically defined geological trends.
Prospect	Geological structure, ready for being drilled, defined in the subsurface space and geological time, potentially holds recoverable quantities of oil and gas.
Lead	Geological or geophysical indication of a Prospect
Pool	Discovered hydrocarbon accumulation (as a single hydrodynamic unit)
Play Components	Geological and hydrodynamic processes resulting in the accumulation of petroleum in the Accumulation Zone of the Play

Essay samples

1. Discuss terminologies of Play, Prospect, Lead & Pool! How Petroleum Plays are defined in the context of sedimentary basins?
2. What kind of geoscience techniques are used for the modelling of various Play processes?
3. Discuss the general framework of Play Fairway Analyses. How are GDE maps produced? Describe the processes of Hydrocarbon Audit and Post Mortem Analyses.
4. Discuss the play analyses to Hydrocarbon Generation, Secondary Migration and Reservoir, Seal, Trap Developments. What do Play Fairway Maps illustrate?

Miskolc, 2023.02.27.

Károly Kiss
lecturer