



PROJECT WORK

MFFAT730006

Petroleum Geoengineering MSc

2023/24 I. Semester

COURSE COMMUNICATION FOLDER

Institute of Exploration Geosciences

Course Title: Project work	Credits: 8
Type (lec. / sem. / lab. / consult.) and Number of Contact Hours per Week: sem. 8	
Neptun code: MFFAT730006	
<p>Type of Assessment (exam. / pr. mark. / other): pr. mark.</p> <p>Teams (of 3–5 students) have to elaborate an AAPG Imperial Barrel Award (IBA) type project and present the final result in a 25-minute ppt presentation, which is followed by a 15-minute question-and-answer session. During the presentations, each individual student is expected to demonstrate: (1) competence in their particular specialist contribution to the project, (2) awareness of the impact of their contribution on the overall project, (3) understanding of the overall aims and results of their team's effort. The 3-member-jury evaluates (1) Introduction (e.g. presentation format and executive summary) – 5%; (2) Regional context (e.g. tectonic setting, regional context, analogues for play elements and fields in their basin) – 15%; (3) Integrated petroleum systems analysis (e.g. source/seal/reservoir, with generation/migration and trap formation, summarized with play element and composite maps) – 20%; (4) Technical interpretation (e.g. consistency of seismic, well-log interpretations, geological concepts) – 25%; (5) Risk assessment, hydrocarbon occurrence/dry hole analysis, volumetrics and technical recommendations – 20%; (6) Question and answer session – 10%; (7) Evidence of team work – 5%.</p>	
<p>Grading limits: >80%: excellent, 70-80%: good, 60-70%: medium, 50-60%: satisfactory, <50%: unsatisfactory.</p>	
Position in Curriculum (which semester): third	
Pre-requisites (<i>if any</i>): Core analysis.	
<p>Course description: Acquired store of learning: <u>Study goals:</u> The AAPG Imperial Barrel Award is a competitive, exploration-based project undertaken by groups of students (typically 4-5 students per team) studying masters-level petroleum geoscience in academic institutions from around the world. The primary aim of the exercise will be for each team to undertake an independent assessment of the petroleum potential of a sedimentary basin. Each team will have a data package comprising of a regional to sub-regional 2D dataset and, where available, well logs (not everything could be traded!) and is expected to produce a comprehensive geophysical and geological evaluation. The Barrel Award utilises international datasets, including those from frontier basins (e.g. North Sea, Barents Sea, Alaska, Gulf of Mexico, S Australia and New Zealand). Evaluation of basin-scale 3D seismic data is now at the core of each project dataset and emphasis is placed on petroleum systems analysis and prospect evaluation. The latter utilises a wide range of software, including basin modelling, structural restoration, reservoir analogues and resource estimation. The key learning elements of the Barrel Award are the following five aspects: (1) evidence of rigorous and creative technical evaluations, (2) the ability to work to a strict deadline, (3) to work effectively within a team (only the team, and not the individuals, are assessed), (4) to make decisions based on inadequate data, and (5) to give lucid oral presentations to a panel of senior industry experts, and highlighting the main risks and uncertainties.</p> <p><u>Course content:</u> Listed below are some of the main technical subjects that will need to be addressed: 1. Geodynamics, plate tectonic setting & tectonic evolution, 2. Sedimentary basins: classification & tectonic setting, 3. Regional palaeogeography, 4. Seismic interpretation, 5. Well log interpretation & correlation, 6. Regional stratigraphy/depositional environments/sequence stratigraphic framework, 7. Source presence and quality evaluation, 8. Subsidence history & source rock maturation/migration</p>	

(including 1D basin modelling), 9. Seal presence and quality evaluation, 10. Trap (structural and stratigraphic) analysis, 11. Formation evaluation, 12. Reservoir presence and quality evaluation, 13. Subsurface fluids & pressure regimes, 14. Dry hole analysis, 15. Prospect evaluation, 16. Risk assessment and volumetric analysis, 17. Final recommendation for business action.

Education method: Imperial Barrel Award type project development (8 ECTS) teamwork.

Competencies to evolve:

T1, T2, T4, T5, T7, T11, T12, K1, K2, K3, K4, K5, K6, K7, K8, K9, K10, K11, A1, A2, A3, A4, A5, A6, A7, A8, A9, F1, F2, F3, F4, F5

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

Allen P.A & Allen J.R. (2013): Basin Analysis. Principles and Application to Petroleum Play Assessment. 3rd. Edition, 642 p., Wiley & Sons, ISBN 978-0-470-67377-5.

Veeken P.P. (2007): Seismic Stratigraphy, Basin Analysis and Reservoir Characterisation. Handbook of Geophysical Exploration: Seismic Exploration. **37**, 523 p., Elsevier, ISBN: 0080453112.

Darling T. (2005): Well logging and formation evaluation. Elsevier, Gulf Professional Publishing, 326 p.

Dake L.P. (2010): Fundamentals of Reservoir Engineering (Developments in Petroleum Science) Elsevier, ISBN: 978-0-444-41830-2.

Van Wagoner J.C., Mitchum R.M.Jr., Campion K.M. & Rahmanian V.D. (1990): Siliciclastic sequence stratigraphy in well logs, core and outcrops: concepts for high-resolution correlation of time and facies. AAPG Methods in Exploration Series, 7, 55 p.

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

György Less Dr., professor, DSc

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

Felicitász Velledits Dr., PhD, associate professor

Péter Vass Dr., associate professor, PhD

Mária Hámorné Vidó Dr., PhD (University of Pécs)

Károly Kiss, junior research fellow

Thematics and schedule for the autumn semester of 2013/24/1

- (1) 13.09.2023: Establishment of teams, distribution of datasets. Introduction to softwares (PETREL, PETROMOD, TECHLOG) I.
- (2) 20.09.2023: University sporting day
- (3) 27.09.2023: Unpacking of datasets, search for bibliography adequate for the given territory. Introduction to softwares II.
- (4) 04.10.2023: Evaluation of geological background (geodynamics, sedimentary basins and paleogeographical evaluation) I. Well log interpretation & correlation I. Seismic interpretation I.
- (5) 11.10.2023: Evaluation of geological background (geodynamics, sedimentary basins and paleogeographical evaluation) II. Well log interpretation & correlation II. Seismic interpretation II. Regional stratigraphy/depositional environments/sequence stratigraphic framework I.
- (6) 18.10.2023: Well log interpretation & correlation III. Seismic interpretation III. Regional stratigraphy/depositional environments/sequence stratigraphic framework II with designation of plays. First interim presentation on the geological background and on the designation of plays.
- (7) 25.10.2023: Petrophysical analysis of the play elements (source, reservoir and seal) with formation evaluation I. Subsidence history & source rock maturation/migration (including 1D basin modelling) I, Trap evaluation I.
- (8) 01.11.2023: Holiday
- (9) 08.11.2023: Petrophysical analysis of the play elements (source, reservoir and seal) with formation evaluation II. Subsidence history & source rock maturation/migration (including 1D basin modelling) II, Trap evaluation II.
- (10) 15.11.2023: Petrophysical analysis of the play elements (source, reservoir and seal) with formation evaluation III. Subsidence history & source rock maturation/migration (including 1D basin modelling) III, Trap evaluation III..Second interim presentation on petrophysical analysis, subsidence history & source rock maturation/migration and trap evaluation.
- (11) 22.11.2023: Designation of prospects. Subsurface fluids & pressure regimes. Dry hole analysis.
- (12) 29.11.2023: Prospect evaluation. Risk assessment and volumetric analysis
- (13) 06.12.2023: Third interim presentation on the prospects (evaluation, risks, volumetry), subsurface fluids & pressure regimes and dry hole analysis. Final recommendation for business action. Preparation of the final presentation.
- (14) 13.12.2023: Final presentation.

Miskolc, August 31, 2023.

Dr. György Less
professor