

Degree programme	Type	Course
Geology	OP	3

Contact lecturer

Name : Sara Tomas Lafaja

Email : sara.tomas.lafaja@uab.cat

Teaching staff

Miquel Poyatos More

Ramon Mercedes Martin

Gumer Galan Garcia

Group languages

You can consult this information at the [end](#) of the document.

Prerequisites

The subject, largely involves integration of basic knowledge on geology, mainly stratigraphy, sedimentology and tectonics; but also interpretation of geological mapping, geochemistry and petrology. We will work with stratigraphic and structural interpretation of seismic reflection data and interpretation and correlation of well log (logs). It is highly recommended the student having already passed the aforementioned subjects.

The acquisition of knowledge on petroleum geology is much more effective and easier if the student has already completed the basin analysis subject, or is studying it in parallel within the same period of time.

Objectives

The objective of this subject is to provide the concepts of petroleum (and reservoir) geology, essentially oriented to the hydrocarbon exploration and basic characterization of conventional and non-conventional reservoirs.

Starting with the analysis of the historical and socio-economic aspects, the subject follows with a detailed analysis of the essential elements forming a petroleum system, to finish with the tools and techniques to characterize geological reservoirs. We will also deal with the future perspectives of the petroleum expert in the energetic transition and global "decarbonization",

Learning outcomes

- CM36 (Propose solutions to the problems arising from the exploitation of geological resources in the context of the global energy transition.) Propose solutions to the problems arising from the exploitation of geological resources in the context of the global energy transition.
- KM43 (Describe the areas of geology with special economic interest in today's industrialised societies.) Describe the areas of geology with special economic interest in today's industrialised societies.
- KM44 (Differentiate the main geological materials in the Earth's crust that can be the object of profitable economic exploitation on a large scale.) Differentiate the main geological materials in the Earth's crust that can be the object of profitable economic exploitation on a large scale.
- KM45 (Identify the orders of temporal magnitude of replacement and renewal of the accumulation of geological materials of economic interest.) Identify the orders of temporal magnitude of replacement and renewal of the accumulation of geological materials of economic interest.
- SM43 (Evaluate the feasibility of exploiting natural geological resources for commercial use.) Evaluate the feasibility of exploiting natural geological resources for commercial use.

Contents

1) Theoretical classes

1.1) Petroleum, composition and geochemical characterization.

1.2) Concept of oil system, mother rock and migration.

1.3) Reservoir rock and geological controls of reservoir quality.

1.4) Classification of reservoirs.

1.5) Tools and techniques for the characterization of reservoirs I. Seismic reflection.

1.6) Tools and techniques for the characterization of reservoirs II. Well logs.

1.7) Exploration of unconventional hydrocarbons.

1.8) The oil geologist today. Socio-economic aspects. The development and future of the oil industry.

1.9) Sustainability, energy transition and carbon storage.

2) Practicals and research seminar

2.1) Practical: require the active participation of students and current aspects related to real cases, their corresponding problems and solutions are treated. They are intended to make the student practice the application of different theoretical aspects. Individual results are discussed between students and teachers. It is about promoting and increasing critical capacity in the face of real problems of socio-economic interest. The aim is for the student to have a future vision of the problem of hydrocarbons as a non-renewable resource and the role of hydrocarbons in the energy transition.

2.2) Seminar: a research work is carried out on a certain type of reservoir (of hydrocarbons, CO₂, geothermal) at the student's choice. The works must be presented orally and discussed with the rest of the class and the teachers in an open debate.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Practical exercises	14	0.56	CM36, KM43, KM44, KM45, SM43
Study of the theory, completion of practical exercises, and preparation of synthesis works	41	1.64	CM36, KM43, KM44, KM45, SM43
Theory	20	0.8	CM36, KM43, KM44, KM45, SM43
Mentoring of works either being individual or in group	10	0.4	CM36, KM43, KM44, KM45, SM43

The theoretical part of this course will follow the indicated program (although there may be slight modifications to the topics and changes in the order) through lectures taught by the faculty.

Recommended bibliography for each topic will be included, and general guidelines will be provided so that students can complete their learning independently. Students will be provided with bibliographical material that allows for open digital distribution, or in other cases, links to specific information of interest as a starting point. Open dissemination material will also be provided for the examples, primarily from the subsurface, discussed in class.

All the information will be provided in the CV of the subject, and the teaching staff reserves the decision to also provide the presentations that the students have presented in class. In no case does the teaching staff accept the obligation to provide good notes, bearing in mind that the subject is done almost completely with the support of the subject's CV resource, and that is where all the content that is exam material is exposed in an orderly manner.

The practical exercises are based on different aspects according to the theoretical content. It is mandatory that each practice is delivered at the end of the practical session, or, as the case may be, at the time established in agreement with the professor, in the space provided in the subject's CV. In any case, practices can also form part of the exam questions.

A research semester will also be carried out on a real reservoir case chosen by the students and based on the concepts learned in class and a bibliographic review of at least 2-3 scientific articles.

Restricted use of AI: "For this subject, the use of Artificial Intelligence (AI) technologies is allowed exclusively in support tasks, such as bibliographic or information searches, text correction or translations. Students will have

to clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how they have influenced the process and the final result of the activity. The non-transparency of the use of AI in this evaluable activity will be considered a lack of academic honesty and may entail a partial or total penalty in the grade of the activity, or greater sanctions in cases seriously."

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Practical exercises and seminars	20%	4	0.16	CM36, KM43, KM44, KM45, SM43
Exams of theory	80%	11	0.44	CM36, KM43, KM44, KM45, SM43

Continuous Assessment

1. Assessment of the theoretical and practical content (80%).According to the arithmetic and/or weighted average of the scores obtained in at least two midterm exams. The minimum grade on the midterm exams for the grades to be weighted will be 3.5.2. Assessment of the Research Seminar (20%)Completion and submission of the practical exercises and the research seminar are mandatory to pass the course. These submissions will be made on the date and time set, in agreement with the teaching staff, in the corresponding space provided in the course CV.

Note on Assessment

It is the student's responsibility to ensure that the digital information submitted directly within the CV environment has been uploaded correctly and can be opened without any difficulty. Files that are corrupted, infected by viruses or Trojans, etc., or that cannot be opened, will not be considered submitted and will therefore not be assessed (0).

Recovery Exams

Students who have not passed the course through continuous assessment may take a final make-up exam on the assigned day and time. The content of the make-up exam will always consist of a theoretical assessment section and may also include a practical section. If applicable, the grade for this make-up exam will replace the grade previously obtained through continuous assessment, and the scoring criteria will follow the same percentage as for continuous assessment.

Single Assessment

Students who opt for a single assessment will take a final exam (given on the same day as the make-up exam) consisting of a theory test (60%), a practical test (20%), and an oral presentation of a research seminar (20%). The latter must be taken on the assigned day, along with the rest of the class. Furthermore, all practical work completed throughout the course must be submitted on the day of the final exam.

Not assessed

If a student has been assessed on a maximum of 33% of the tests and chooses to withdraw, the final grade will be NOT ASSESSED.

Bibliography

Basic recommended bibliography:

Bend. S.L. (2010). Petroleum Geology eTextbook (ver 1.1). AAPG Special Publication on CD-ROM

Bjorlykke, K (2010). Petroleum Geoscience: From Sedimentary Environments to Rock Physics, Springer

Bronlow A.H. (1996) Geochemistry, Prentice Hall

Killops S.D., Killops, V.J. (1993). An introduction to organic geochemistry. Harlow: Longman. Copublished in the USA by John Wiley

Rider, M (2006) - The Geological Interpretation of Well Logs- II edition - Rider french consulting Ltd

Selley, R. C. (1998) - Elements of petroleum Geology- II edition - Academic press

Slatt R. (2006). Stratigraphic Reservoir Characterization for Petroleum Geologists, Geophysicists and Engineers. Handbook of petroleum exploration and production. Vol. 6. John Cubit (Ed). Elsevier

Software

—

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE