Geology of Petroleum

Code: 101052
ECTS Credits: 4

2025/2026

Degree	Type	Year
Geology	OT	3
Geology	OT	4

Contact

Name: Sara Tomas Lafaja

Email: sara.tomas.lafaja@uab.cat

Teachers

Gumersinda Galan Garcia

Teaching groups languages

You can view this information at the end of this 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 geochronology, as well as 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 subjects where the mentioned disciplines are dealt with.

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 and Contextualisation

The objective of this subject is to provide the most basic concepts of petroleum geology, essentially oriented to the hydrocarbon exploration and basic characterization mainly of conventional reservoirs, and less those nonconventional.

Starting with the analysis of the historical and socio-economic aspects, as well as the projection to the future within the energetic transition time and the final global "decarbonization", the subject follows with a detailed analysis of the essential elements forming a petroleum system, and geological characterization of reservoirs.

Competences

Geology

- Display knowledge of the applications and limitations of geophysical methods for learning about the Earth.
- Display understanding of the size of the space and time dimensions of Earth processes, on different scales.
- Draw up and interpret geological maps and other means of depicting geological information (columns, correlation frames, geological cross-sections, etc.)
- Identify and tackle environmental problems, plan land-use and know the principles of prevention and mitigation of geological risks.
- Obtain information from texts written in other languages.
- Plan the exploration and sustainable development of geological resources.
- Process, interpret and present laboratory data using qualitative and quantitative techniques, and suitable computer programmes.
- Recognise, depict and reconstruct tectonic structures and the processes that generate them and relate types of rocks and structures to geodynamic environments.
- Recognise theories, paradigms, concepts and principles in the field of geology and use them in different areas of application, whether scientific or technical.
- Show initiative and adapt to problems and new situations.
- Suitably transmit information, verbally, graphically and in writing, using modern information and communication technologies.
- Synthesise and analyse information critically.
- Work in teams, developing the social skills needed for this.
- Work independently.

Learning Outcomes

1. Correctly interpret geological information with applications in the exploration of hydrocarbons and mineral deposits, and in geological engineering.
2. Correctly sample industrial mineral and rock deposits.
3. Draw up geological cross-sections or other types of presentation for geological data in order to characterise hydrocarbon reserves and mineral deposits.
4. Draw up subsoil interpretation tables and graphs in relation to geological engineering.
5. Evaluate the environmental problems related to mining, industrial rock and hydrocarbon exploitations.
6. Explain the genesis processes of the principal types of mineral deposits, and their evolution across time.
7. Obtain information from texts written in other languages.
8. Process, interpret and present analysis results.
9. Relate Earth processes to those of mineral and oil genesis.
10. Relate the theories and principles of geology to the exploration of reserves and mineral deposits, and to problem solving in geological engineering.
11. Show initiative and adapt to problems and new situations.
12. Solve problems in reserves, mineral deposits and geological engineering based on field and laboratory observations and the concepts studied.
13. Suitably transmit information, verbally, graphically and in writing, using modern information and communication technologies.
14. Synthesise and analyse information critically.
15. Use geochemical methods to detect and study mineral deposits.
16. Work in teams, developing the social skills needed for this.
17. Work independently.

Content

1) Theoretical Classes

1.1) Petroleum, composition, and geochemical characterization.

1.2) The petroleum geologist today. Socioeconomic aspects. The development of the petroleum industry. Sustai

1.3) Concept of the petroleum system. Source rock, migration, reservoir rock, and trap. Plays and prospects, bas

1.4) Reservoir classification.

1.5) Tools and techniques for reservoir characterization.

1.6) Principles of reservoir characterization and geological controls for reservoir quality.

1.7.) Exploration for unconventional hydrocarbons.

1.8) Other reservoirs.

2) Practical Exercises and Research Seminar

2.1) Practical Exercises: These require active student participation and a

2.2) Seminar: A research project is conducted on a specific type of reservoir (hydrocarbon, CO2, geothermal) of t

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical exercises	14	0.56	14, 11, 1, 2, 6, 4, 8, 9, 3, 13, 17
Theory	20	0.8	1, 10, 2, 6, 7, 4, 8, 15, 9, 12, 3, 5
Type: Supervised			
Mentoring of works either being individual or in group	10	0.4	14, 11, 1, 2, 6, 15, 9, 3, 13
Type: Autonomous			
Study of the theory, completion of practical exercises, and preparation of synthesis works	41	1.64	14, 11, 1, 10, 2, 6, 7, 4, 8, 15, 9, 3, 13, 17, 16, 5

The theroetical 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.

Recommenden 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) technologiesis 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

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exams of theory	80%	11	0.44	14, 11, 1, 10, 2, 6, 7, 4, 15, 9, 12, 3, 13, 17, 16, 5
Practical exercises and seminars	20%	4	0.16	14, 11, 1, 2, 6, 4, 8, 15, 9, 12, 5

Continuous Assessment

1. Assessment of the theoretical and practical content (80%).
According to the arithmetic and/or weighted average of the scores obtain
2. Assessment of the Research Seminar (20%)
Completion and submission of the practical exercises and the research s

Note on Assessment

It is the student's responsibility to ensure that the digital information subn

Make-up Exams

Students who have not passed the course through continuous assessme

Single Assessment

Students who opt for a single assessment will take a final exam (given or

Not assessed

If a student has been assessed on a maximum of 33% of the tests and chooses to withdraw, the final grade will b

Bibliography

Basic recomended bibliography:

Bend. S.L. (2010). Petroleum Geology eTextbook (ver 1.1). AAPG Spetial 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

_

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	1	Spanish	second semester	morning-mixed
(TE) Theory	1	Spanish	second semester	morning-mixed