Reservoir Geology and Geophysics

What is its aim?
The master’s degree Reservoir Geology and Geophysics is an interuniversity degree coordinated by the University of Barcelona and the Autonomous University of Barcelona, with the participation of the Institute of Earth Sciences Jaume Almera of the Spanish Scientific Research Council (ICTJA-CSIC) and the Institut Cartogràfic i Geològic de Catalunya (ICGC). It is intended to provide students with training in the main lines of R & D & I currently pursued in the exploration and in the geological and geophysical reservoir characterization.

The master aims at educating and training the students to understand and analyze geological reservoirs from different perspectives and scales, and to effective characterize structural and sedimentary systems.

In this sense, this master focuses on an integrative and multidisciplinary formation, which includes from field trips to computerized classes that allow the students to gain familiarity in the most modern techniques, such as three-dimensional modelling of reservoirs or the analogical and numerical modelling of geological processes.

Where does it lead?
This master leads to obtain highly qualified professional preparation and to be able to meet the most demanding requirements of companies exploring and managing sedimentary reservoirs. It also leads to develop scientific research careers.

Who is it aimed at?
The master's degree is addressed to students with broad education in the Earth sciences, including prior knowledge of specific disciplines in the program. Applicants should hold an official bachelor’s degree or an equivalent undergraduate degree in geology, physics, geological engineering or mining engineering.

International students in possession of a bachelor’s degree which has no specific equivalent in Spain are welcome to apply, provided that their degree curriculum covers aspects of geology and geophysics.

Location and Contact Information
The management centre is the Faculty of Geology of the University of Barcelona.

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Facultat de Ciències de la Terra. Universitat de Barcelona
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Contact Information
Coordinator: Juanjo Ledo Fernández

http://www.ub.edu/estudis/mastersuniversitaris/geologiageolica

Information and administrative processings
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Objectives and competences

In addition, students who successfully complete the course will be able to:

- Understand and apply resources for characterizing a sedimentary reservoir
- Understand petroleum systems, seek out potential reservoirs and evaluate their behaviour
- Classify and analyse sedimentary materials and tectonic structures
- Understand geological systems of the earth’s crust, quantify and predict the phenomena involved in its generation and evolution, and understand the procedures for modelling them.
- Incorporate information obtained from multidisciplinary data into a single model
- Understand the fundamental mathematical, physical and geological principles applicable to geophysics
- Identify the predominant processes in any geodynamic setting and determine the corresponding time and spatial scales
- Prepare, process, interpret and present geological and geophysical data using the appropriate techniques, and solve numerical problems
- Apply acquired knowledge and a range of methodologies to analyse large-scale and small-scale processes

Student profile

The Master is an interdisciplinary qualification that integrates and develops the knowledge previously acquired by students in the disciplines of geophysics and geology. Therefore, it is recommended for students with broad education in the Earth sciences.

Students should also be rigorous and autonomous, motivated to work in the field and in the laboratory, have a relatively strong level of mathematics and a good aptitude for using the latest tools and technologies.

Provenance of the students

From 2012 to 2016

- Rest of the world 41%
- Spain 48%
- Rest of Europe 11%
Course Plans

The academic program includes 60 ETCS, from which 15 are obligatory, and 20 are elective. The elective credits can be selected amongst the 37.5 offered credits. The rest of the credits correspond to the Master’s Degree Final Project.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credits</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Geology and Geophysics</td>
<td>5</td>
<td>Obligatory</td>
</tr>
<tr>
<td>Seismic reflection: seismic processing and interpretation</td>
<td>5</td>
<td>Obligatory</td>
</tr>
<tr>
<td>Integrated analysis of real basin and reservoir analogues</td>
<td>5</td>
<td>Obligatory</td>
</tr>
<tr>
<td>Reservoir geology</td>
<td>2.5</td>
<td>Elective</td>
</tr>
<tr>
<td>Diagenesis</td>
<td>2.5</td>
<td>Elective</td>
</tr>
<tr>
<td>Basin analysis</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>Petroleum systems</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>Clastic sedimentology</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>Carbonate sedimentology</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>Structural geology</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>3D geological and reservoir modelling</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>Basin architecture</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>Lithosphere dynamics and topography</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>Geophysical characterisation and monitoring of reservoirs</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>Well log analysis and petrophysics</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>Geophysical data analysis</td>
<td>2.5</td>
<td>Elective</td>
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<tr>
<td>Near-surface geophysics</td>
<td>2.5</td>
<td>Elective</td>
</tr>
<tr>
<td>Geophysical data field acquisition</td>
<td>2.5</td>
<td>Elective</td>
</tr>
<tr>
<td>Master’s Degree Final Project</td>
<td>25</td>
<td>Obligatory</td>
</tr>
</tbody>
</table>

The Master offers 25 places
Language of teaching is English
Technology and materials

Software

Specialized software used in the hydrocarbon industry, as for example:

- Petrel E&P Software Platform
- Reservoir Management Software (RMS)
- GOCAD®, Move
- IHS Kingdom®, SeisSpace® Promax®, Matlab®, BasinMod®, PetroMod
- Petroleum Systems Modeling Software, Zond software package.

Laboratory and specialized spaces

Analogue Modelling Laboratory
Geophysical equipment: gravimeters, magnetotelluric, electrical tomography system, GPR, near surface seismic system, passive seismic, magnetometers.

Laboratories of 2D/3D geological and numerical modelling
- Paleomagnetism laboratory
- Petroleum geochemistry laboratory

Core laboratory (CORE-LAB) for non-destructive analysis of geological materials
Core description room
LIDAR
Scanning electron microscopy, electron microprobe, X-ray diffraction, stable isotope analysis, gas chromatography, mass spectrometry, within others.
Optical microscopy and cathodoluminescence laboratory

Collaborative companies

- REPSOL
- TOTAL
- IFP Energies nouvelles
- Schlumberger
- EMERSON
- CEPSA
- midland valley
- HALLIBURTON
- Bentley
- PRA
- Paradigm
- IHS
- MathWorks