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## ***Teach Mob – Visiting Professors*** ***Academic year 2016/2017***

<b>2nd Term</b>
<p><b>COURSE TITLE</b>  <b>Geomechanics and applications to Geology</b>  <b>Geological Field investigation</b>  <b>Local Seismic Site Response and slope stability</b></p>
<p><b>Scientific area</b>  <b>Geology, Applied Geology, Geophysics, Structural Geology</b></p>
<p><b>Department of Earth Sciences</b></p>
<p><b>Language used to teach</b>  <b>English</b></p>
<p><b>Teaching Commitment: 14 hours</b></p>
<p><b>Course summary</b>            The characterization of the physical and mechanical properties of carbonate rocks is fundamental to understanding their long-term evolution and the dynamics of the crust, whether dealing with applications to reservoirs or to fault slip.            The course will focus specifically on carbonate rock properties influence on fluid movements and interaction between rocks and fluids and how rock properties influence saturation, wettability, capillarity, capillary pressure and reservoir quality.            The course will elucidate the time dependent deformation properties of carbonate rocks under stress and the relationships between dilatancy, compaction, failure and fluid flow, by integrating experimental methodologies such rock deformation laboratory experiments, microstructural observations with particular emphasis on X-ray Computed Microtomography (mCT). Upscaling of the results to field structures and deformation/slip processes in carbonatic sequences will be presented.            Borehole geophysics in carbonatic sequences will be also discussed in terms of methods and relationships between resistivities, acoustic velocities and formation factor and porosity.            Finally the exploration for and exploitation of carbonate reservoirs methodologies and main results will be covered as well as case histories and exercises from around the world.</p>
<p><b>Learning objectives</b></p> <ul style="list-style-type: none"> <li>- Recognize basic characteristics of carbonates</li> <li>- Understand the complexities of carbonate rocks and systems</li> <li>- Understand the time dependent evolution of rock properties under stress</li> <li>- Understand the fluid flow and deformation coupling</li> <li>- Model and predict the stability of faults systems in carbonate rocks</li> <li>- Understand the use of borehole geophysics for imaging carbonatic reservoirs</li> <li>- Develop viable exploration and exploitation strategies in carbonate systems</li> </ul>

**Tutorship activities**

**Lab activities**

**Other activities besides the course: i.e. seminars and conferences addressed to PhD students and research fellows, dissemination conferences**

A short course based on 4 hours on the topic presented will be offered to the PhD students.

**Visiting Professor Profile**

The Visiting Professor is expected to be actively involved in research studies related to rock physics and rock mechanics applied to reservoir compaction and long-term stability of formation preferentially with relation to oil extraction, waste disposal, CO<sub>2</sub> sequestration and geothermal systems. He/she must hold expertise in Rock Physics, Fracture mechanics, Hydrology and Borehole Geophysics and experience in teaching these subjects at the correspondent level required.

The candidate must be an internationally recognised expert on the development of strain localization in carbonates and on time-dependent deformation and failure of these rocks with focus on energy resources, environmental applications and natural hazards. He/she should preferentially be engaged in both the phenomenological and micromechanical aspects of rock deformation and fluid flow in carbonate rocks, by integrating high-pressure deformation experiments, quantitative characterization of microstructure and theoretical analysis.

**Contact person at the Department**

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