CIVIL-429

Reservoir geo-mechanics engineering

Lecampion Brice

Cursus	Sem.	Type
Mechanics		Obl.

Language of teaching	English
Credits	3
Session	Winter
Semester	
Exam	During the semester
Workload	90h
Weeks	14
Hours	**3 weekly**
Lecture	2 weekly
Exercises	1 weekly
Number of positions	

Content

- Introduction to geo-energy & the different types of subterranean reservoirs
- Introduction to numerical methods in geomechanics (FE/FD algorithms for hydro-mechanical coupling)
- Deep well construction
- Poroelasticity & flow in deformable fractures
- Extension to thermal effects
- Fluid flow around a well, pore-pressure diffusion, interference between wells, introduction to reservoir management.
- Effects induced by fluid withdrawal and/or injection: fault re-activation, induced seismicity, surface deformation, cap-rock integrity, un-controlled fracturing.
- Introduction to hydraulic fracturing for well stimulation.
- Applications to conventional and unconventional hydrocarbon resources, deep geothermal systems and CO2 geological storage.

Expected student activities

A group project will be assigned mid-october and run through the end of the semester. It will count for 50% of the grade. It will involve the following steps: i) solving anaytically/numerically a simplified configuration linked to a real engineering problem, ii) discussing order of magnitude via dimensional analysis, iii) and discuss the relevance of the results for practice.

Assessment methods

50% Project during the semester
50% Final oral exam