International Petroleum Engineering Curricula Towards a More Resilient Swinging Global Market

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Introduction
What does the Industry want from a PE Graduate?

"scientific principles, logic, common sense, experience and luck to economically produce hydrocarbons using environmentally sound practices as applied to geologic systems that are never completely understood nor described” (Battalora, 2010)

Source: SPE, 2012
Selected Universities

1. Clausthal University of Technology, the traditional home for oil and gas studies in Germany, and the only one teaching in English.

2. Imperial College London, one of the prime oil and gas universities in the United Kingdom;

3. Texas A&M University, with one of the largest Petroleum Engineering departments in the US;

4. University Oil and Gas Ploiesti in Romania, representative for Eastern Europe.

5. University of Oklahoma, the world’s first petroleum geology school
MS petroleum engineering studies at Clausthal University of Technology, Germany

Geothermal engineering studies at Clausthal University of Technology, Germany (ITE, 2016)
MS Petroleum Engineering studies at Imperial College London (Imperial College, 2013)
Petroleum Engineering Studies at University “Oil and Gas”, Ploiesti

Master Course of Studies

Management, Economics, Law, Communication

Reservoir Engineering
Drilling, Production
Mechanical equip. D&P
Refinery Chemical
Petroleum Geology

External semester Master Thesis

1, 1.5 or 2 Years
Petroleum Engineering Studies at University of Oklahoma, Norman, OK, USA

Master Course of Studies

Petroleum Engineering
Core Courses, Special courses,
Original Research

Natural Gas Engineering
Core Courses

Elective Courses

Master Thesis

2 Years

Master Thesis
Where to go then?

Better to have 1-year or 2-year MS program?

Standardized International PE Curriculum vs. Region-Specific Programs

Well Rounded PE graduates or Specialized Practitioners?
\textit{TRIR} = Total Recordable Injuries Rate

Oil & Gas extraction TRIR: 1.3 (2013)
Conclusions - 1

A review of published surveys of what the industry wants from PE graduates and of the PE curricula of a number of selected universities in the USA and in Europe (with a focus on the MS level) was shown.

The authors suggest the need for a reorganization of current MS PE programs worldwide, to reflect the relatively recent changes to academic degrees in some regions (e.g. the “shrinking” of BS programs following the Bolgna reform, from the traditional 5 years to 3 or maximum 4), and the continued internationalization of the industry.
Conclusions - 2

Specialization in given sub-disciplines (e.g. reservoir, drilling, production, etc.) should only be built upon solid PE fundamentals. Students who already have the basic PE knowledge should be allowed to move faster into the industry, or PE practitioners who already work in the industry should be allowed to take a shorter break for a specialization MS.

The issue of whether the oil and gas industry would benefit more from a standardized, international PE curriculum or from region-specific programs remains difficult to address.
Conclusions - 3

MS programs worldwide reflect traditional expertise and local technical priorities, and it is important to ensure that local students acquire local knowledge. On the other hand, they must develop the appreciation of international operations and issues, due to the global nature of the oil and gas business, which requires its workforce to be mobile.

Moreover, graduates with a different minor/major have a better chance to diversify their job search compared to those with highly specialized degrees.
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