APPLIES TO ACADEMIC YEAR 2013/2014

GRA 8182 The Oil Fundamentals

Programme
Executive Master of Management in Energy (EMME)

Responsible for the course
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Department
Department of Innovation and Economic Organisation

Term
According to study plan

ECTS Credits
6

Language of instruction
English

Introduction
The history of petroleum is inseparable from that of the major oil companies (NOCs and IOCs) which formed and grew rapidly in order to seek, produce, transform, transport and sell oil. The understanding of the key components and the challenges of this upstream business will give the participants the ability to build their own vision on the future of this oil industry. Participants will receive a comprehensive understanding of the energy scene (international energy outlook) and a clear view of the upstream sector in all its aspects: reserves, technologies, innovations, players (IOCs, NOCs and contractors), investments, costs and taxation systems. This is followed up by sessions devoted to downstream business like refining and petrochemicals economics with a focus on refining margins and demand volatilities. Finally sessions dedicated to trading and risk management of oil products will be included.

Learning outcome
Upon completion of this first week, the students will be able to:
· Describe the key technical, innovative and economic features of the oil industry and its major players
· Identify and analyse the different components of the crude oil price and the evolution of the by-products prices (petroleum products and chemicals)
- Analyse the techno-economics of the upstream sector in all its aspects: reserves, players (IOCs, NOCs and Contractors), investments, costs, benchmarking, risk management, etc.
- Analyse the techno-economic framework of the downstream part of the oil business: refining and petrochemicals
· Explain how crude oil is traded in the physical market and how hedging strategies are implemented
Evaluate the risk of traded products such as futures, swaps and options in the oil market

Prerequisites
Granted admission to the Executive Master of Management in Energy Management.

Compulsory reading

Other:
Compulsory Reading (before the module). Exploration and production
- Five 2-page papers with a glossary: 1.What a hydrocarbon field is / 2.Geology-Geophysics / 3.Drilling / 4.Development of a field / 5.Production of a field
- One 5-page Paper: John Brodman, Ifri, actuelles de l'Ifri, The U.S. Oil and Gas boom, 2012 (overview of the shale gas/oil and very clear explanation of the differences between oil shale, shale oil and tar sands)
- Video: Stanford University, Woods Institute, "The Future of Oil" by Robert Horne (resources, reserves, recovery rate, depletion, etc.)
http://www.youtube.com/watch?v=KTsYjRqPmNA

Refining and Petrochemicals
- 2-page papers with a glossary
- Video: Crude Oil Distillation Process (http://www.youtube.com/watch?v=gYnGgre83CI)

Oil & Products Trading
- A 3-page papers on Oil Markets (spot, forward and futures markets)
- Video: Energy Hedging Terminology, http://www.cmegroup.com/education/interactive/webinars-archived/energy-hedging-terminology.html (Energy Trading and Hedging Jargon, NYMEX)

How to make a deal in a financial commodity exchange? Anatomy of a trade (NYBOT)
http://www.youtube.com/watch?v=AFJ5II_C4EY
- What is a future contract? NYMEX Future Contracts: http://www.youtube.com/watch?v=HMOLE1HzPSg

Recommended reading

Other:
Recommended Reading (before / during / after the module).
Energy
"Beyond Smoke and Mirrors: Climate Change and Energy in the 21st Century", Burton Richter, Cambridge University Press

Oil
"Oil: a beginner's guide", Valcav Smil, ONEWORLD Oxford

Exploration and production
- A list of articles will be provided
- "Oil and Gas Exploration and Production", Bret-Rouzaut, Favennec, Editions Technip, 2010

Refining and Petrochemicals
- "Petroleum refining: Refinery Operation and Management", J.P. Favennec, Editions Technip.
- "Petroleum Refining for the Non-technical Person", W.L. Leffler, PennWell Edition.

Oil & Products Trading
Fattouh, B, 2011, "An Anatomy of the Crude Oil Pricing system", WPM 40, Oxford Institute for Energy Studies
Hull, J.C., 2006, Options Futures and other derivatives, Pearson
International Energy Agency, 2011, The Mechanics of the Derivatives Markets. What They Are and How They Function, (http://omrpublic.iea.org/special_sup_apr11.pdf)

Mabro, R.,1984 On Oil Price Concepts. WPM3, Oxford: Oxford Institute for Energy Studies

Video: Robert Schiller, Lessons on on Forward and Futures Markets
http://www.youtube.com/watch?v=X_rfROvI9j4
Robert Schiller, Lesson on Exchanges, Brokers, Dealers, Clearinghouses
http://www.youtube.com/watch?v=kAl8DezwLAE&playnext=1&list=PLDC67C77DEF11FD0D

Course outline
The Global Energy Outlook
- Global energy production and consumption
- Future of Energy demand: constraints, challenges, opportunities
- Oil price, energy price – Influence of supply, demand, futures markets
- The actors of the energy scene
- International Energy agency (IEA) Conference : Debate with IEA Experts

Oil Exploration and Production:
- Key figures in Upstream (challenges & players) & New debates
- Oil Reserves, Investments and Costs
- Legal and Fiscal Aspects : Concession, Production Sharing Contract, Service Contract
- Crisis management in upstream

Downstream Economics
- Oil refining, refining margins and costs components.
- Petrochemicals and their economic framework
- Pipe-line transportation

Introduction to Trading & Risk Management:
- Oil pricing regime & Oil price formation
- Spot, forward & futures markets
- Hedging & risk assessment

Computer-based tools
It's Learning

Learning process and workload
1 ECTS credit corresponds to a workload of 26-30 hours.

Attendance to all sessions in the course is compulsory. If you have to miss part(s) of the course you must ask in advance for leave of absence. More than 20% absence in a course will require retaking the entire course. It's the student's own responsibility to obtain any information provided in class that is not included on the course homepage/ It's learning or other course materials

Examination
The course evaluation will be based on:
- 50% Quizz (individual)
- 50% Case Study Group

This is a course with continuous assessment (several exam elements) and one final exam code. Each exam element will be graded using points on a scale (e.g. 0-100). The elements will be weighted together according to the information in the course description in order to calculate the final letter grade for the course.

Specific information regarding student evaluation beyond the information given in the course description will be provided in class. This information may be relevant for requirements for term papers or other hand-ins, and/or where class participation can be one of several elements of the overall evaluation

Examination code(s)
GRA 81821 - Continuous assessment; accounts for 100 % to pass the program GRA 8182, 6 ECTS credits

The course is a part of the Executive Master of Management in Energy (EMME) and all evaluations must be passed to obtain a certificate for the degree.

Examination support materials

Re-sit examination
Re-takes are only possible at the next time a course will be held. When course evaluation consists of class participation or continuous assessment, the whole course must be re-evaluated when a student wants to retake a exam. Retake examinations entail an extra examination fee.

Additional information