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INTRODUCTION

IFP School is a graduate school in the fields of energy (petroleum, gas, petrochemicals, power & new energy technology) and engine systems.

The School prepares its students to take part in the energy transition of the 21st century, combining versatile disciplinary training and strong international exposure with a view towards their professional success. The School draws on a solid industrial base as well as the scientific environment offered by IFP Energies nouvelles.

The aims and overall content of each program is discussed and validated each year with the School’s industrial partners belonging to the Steering Committees specific to each field.

These Steering Committees meet in order to identify, for each program, the learning and skills expected of the School’s graduates in terms of their knowledge, know-how and behavior.

The nine programs offered by IFP School through either classroom education or apprenticeships\(^1\) provide high-level applied training with which graduates can acquire a solid base of knowledge and skills. In the process, they gain a lasting foundation for their subsequent professional careers and can quickly assume responsibilities in a wide range of entry-level fields in the energy and engine systems industries.

In the course of these programs, each lasting 16 months\(^2\), students acquire:

- the requisite level of theoretical knowledge relating to their sector of study,
- the practical (i.e., technical and economic) knowledge that is required in order to gain immediate recognition as a “professional” in the field in question,
- work methods (project performance, communication techniques, etc.) and practice in implementing their acquired knowledge,
- a general background in both energy and engine systems as well as familiarity with “non-technical” (i.e., human, cultural, ethical) aspects of the engineering profession.

In particular, the instructional methods used will:

- draw on the contributions of apprentices with experience in day-to-day industrial activities in order to further enhance each student’s motivation and sense of involvement and provide a more realistic perspective. Combined with this cross-fertilization of experience, the mix of nationalities among students at the School promotes intercultural dialogue;
- consolidate and capitalize on the experience acquired through the apprenticeship;
- in a more academic format, provide non-apprentice students with the same type of instruction in the technical and non-technical aspects of engineering that apprentices acquire during their on-the-job training.

---

\(^1\) except RGE and PEM
\(^2\) except GOL, GOP, Petroleum Engineering and Project Development, and students with four years of post-baccalauréat education
In addition, the School requires students to develop a personalized training plan for fulfilling both the technical objectives specific to each program and the overall objectives set by IFP School: to be a responsible career professional, able to work as part of a team within a multicultural environment and communicate effectively.

A wide range of knowledge and know-how is provided through coursework, conferences, seminars, practical exercises, projects, internships in the field, or periods of in-company training, by an exceptionally diverse array of personnel (IFP School professors, specialists in continuing education, researcher, industry experts), giving students the opportunity to benefit from the faculty’s extensive experience.

Courses, seminars, and projects are grouped into teaching units (TUs) corresponding to a given program’s various areas of expertise, and cover both the areas of knowledge to be acquired and their application for purposes of problem resolution.

Each TU falls under the responsibility of an instructor who ensures the appropriateness of the TU’s content, the quality and consistency of the instruction, and the proper administration of tests. Each TU is assigned a certain number of ECTS points that are credited to the student subject to validation.

The tests are primarily designed to verify the student’s proper assimilation of knowledge, i.e. his or her ability to use that knowledge on an operational level to resolve an actual problem. Consequently, the School gives preference to personalized, interactive testing methods (oral examinations or projects in particular) as part of a comprehensive, appropriate assessment that includes technical and economic know-how, quality of presentation, and the ability to adopt a broader perspective in order to resolve a given problem.

In addition, students are asked to complete questionnaires in which they evaluate the pedagogical quality of the instruction they received as well as its suitability (content, procedures) with respect to defined objectives. The results of these surveys are analyzed with a view towards defining any corrective action needed.

In order to obtain the degree issued by the School, students must have validly completed all of the TUs that make up their program.

For each TU, the validation process includes a repeat examination if the student fails to pass the initial examination.

If any TU has not been validly completed, even after the repeat examination, the board may decide to award the degree if, after a review of the student’s results, progress, participation, and overall performance during the degree program, it believes the degree is merited.

The degree may not, however be granted to students who have failed more than one TU.

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3 European Credit Transfer System
FREQUENTLY ASKED QUESTIONS

**WELCOME TO IFP SCHOOL**
The Petroleum Economics and Management (PEM) program information booklet aims to answer the many questions you may have concerning the application procedures for IFP School and life in France. It also covers a range of other details aimed at reducing the stress of entering a new course of study and a country.

**ABOUT THE COURSE**
What does the program offer to its participants?
The International Collaborative Program in Petroleum Economics and Management is designed for students or professionals with degrees in science, engineering or social science (Business School, law…), seeking in-depth training to develop a commanding skill set in energy techniques, energy economics and management. During the program the participant is exposed to the multicultural nature of the industry with a multinational classroom and semesters spent in the partner university.

The PEM program is organized in collaboration with the following Partner Universities (PU):
- Audencia School of Management - (France)
- BI Norwegian School of Management (Norway)
- CEPMLP – University of Dundee (Scotland)
- China Univ. of Petroleum at Beijing (China)
- Colorado School of Mines (USA)
- ESCP Europe (France)
- ESSEC (France)
- Gubkin University (Russia)
- Oklahoma University (USA)
- Texas A&M (USA)
- University of Alberta (Canada)
- University of Sao Paulo (Brazil)

For some of the partner universities (PU) dual degrees are possible. This may require dual applications
- Colorado School of Mines (CSM) (Msc in Mineral & Energy Economics)
- Gubkin University (Master in Oil & Gas Economics & Management)
- Oklahoma University (OU) (MBA in Managerial Economics)
- Texas A&M (TAMU) (Master of Petroleum Engineering)

**COURSE OBJECTIVES**
On completion of the Petroleum Economics and Management Program, students are expected to:
- Be able to take up a position requiring multidisciplinary skills in the energy sector,
- Gain an understanding of the upstream and downstream energy sectors in their economic, commercial, financial and environmental dimensions (key economic data and characteristics, management tools, etc.) and technical dimensions for the students who choose the curriculum with technical courses (reservoir engineering, refining processes, etc.),
- Be internationally minded and capable of teamwork in an international context,
- Be capable of using the main management and decision-making tools for making and justifying operational decisions.

**WHO SHOULD APPLY TO THE COURSE?**
The PEM course takes participants, recent graduates (Bsc / Msc level) and professionals, all with strong quantitative and qualitative skills and a desire to enter the challenging energy industry.

**QUICK FACTS**
Language of instruction: English

- # of Class participants: 25 – 35
- Program length: 11 – 22 months
  (Dependent on participants’ background and PU)
- Program Start date: 3rd week of August or January.

**FEES & FINANCING**
Application Fee: €0
Registration Fee (IFP School): €0
Cost of living: €1 200-1 500 / month
Insurance: EU insurance required
Tuition Fees
- Recent Graduates from universities & no professional experience, applying individually
  €0
- Professionals €30 000*
  *(accommodation and travel expenses not included)
- Entrants from partner universities See PU website

It should be noted that in the PU, additional fees may be applicable.
Few scholarships are available at IFP School (1/program in average); therefore the IFP School ask the applicant to apply directly to companies, governments or other organizations for financial assistance before starting the program.
There are no scholarships for professionals sponsored by their company.

**Text Books**
- IFP School: textbooks provided (100 € refundable)
- In the partner University: textbooks may be required (75 – 100 €/book)
APPLICATION PROCEDURES
Accepted from: November 15th
Deadline: March 31st
Admission Board: Mid May
Apply directly to: http://application.ifp-school.com

IFP School will transmit the application file to the Partner University (PU) except for TAMU, in which you need to get a parallel admission. You should apply on the earliest possible date to ensure interviews with staff members (in Paris or by telephone) can be organized. For queries concerning your application documents please email contact-ifpschool@ifpen.fr

Application Success rate
IFP School selects around 25 students every year, with rest selected from our partner universities.

ADMISSION REQUIREMENTS:
English Proficiency: For the PEM program, a high level of English is required and Proficiency scores should be less than 2 years old.
GRE - see www.gre.org, GMAT - see www.gmat.org, TOEFL - see www.toefl.org, IELTS - see www.ielts.org

Code number of IFP School: ETS 7084
What results do I need? (Minimum score)
CSM & TAMU: TOEFL: 80 IBT, 213 computer based, 550 Paper Based or 6.5 for the IELTS and GRE: Verbal 510 (old test) 154 (new test) = 64%, Quantitative 701 (old test) 156 (new test) = 71%, Writing 4.18 (or (Only for CSM) GMAT: Verbal 31 (59%), Quantitative 44 (72%), Writing 4.31 (47%) Total 635
OU: GMAT: 710 and TOEFL: 80 IBT
Simple Degree Partner and Gubkin University: TOEFL: 80 IBT

PROGRAM STRUCTURE
Double Degree Program (IFP School + Partner Degree):
A first Fall Term (from end of August year n to end of December year n) at CSM, Gubkin, OU or TAMU
_ A Spring Term at IFP School (from January year n+1 to end of April year n+1)
_ A Summer Term at IFP School (from April year n+1 to end of July year n+1)
_ A second Fall Term (from end of August year n+1 to end of December year n+1) at CSM, Gubkin, OU or TAMU.

Simple Degree Program (IFP School Degree)
A first Fall Term (from end of August year n to end of December year n) in the PU (Single degree PU, see graph below))
_ A Spring Term at IFP School (from January year n+1 to end of April year n+1)
_ A Summer Term at IFP School (from April year n+1 to end of July year n+1)
_ A 4 months internship from September to December.

It’s also possible to start with the internship and to spend one term in the partner university after the IFP School terms. In both cases, the student gets only the IFP School degree.

Audencia, BI Oslo, CUP Beijing, ESCP, ESSEC, U. Alberta, U. Dundee, U. Sao Paulo

APPLICANT TYPES
Recent Graduates (1):
If the course participant is undertaking a double degree then the participant will return to the PU to complete a second Fall term. (Total duration: 16 months; Credits: 80 ECTS)
Degree(s) awarded: PU’s Degree & Master degree in Petroleum Economics (DNM) or Diplome d’Ingénieur (DI – Engineering degree).

Recent Graduates (2):
If the course participant is a recent graduate from a French engineering school with which an agreement exists, with only 4 years of higher education (BAC +4) and one year spent in a company during the studies (année de césure), then the participant will return to the partner university to complete a second Fall term and for the completion of the program he must undertake a work placement for 6 months. (Total duration: 22 months; Credits: 100 ECTS)
Degree(s) awarded: PU’s Degree & Diplome d’Ingénieur (DI – Engineering degree)

Recent Graduates (3):
If the course participant is undertaking the IFP School degree only and is a recent graduate with 4 or 5 years of higher education, the 2nd fall term must consist of an internship within a company or direct entry into a full time employment. On the completion of the work placement, a concise report must be written on the time spent in the company. (Total duration: 16 months, Credits: 80 ECTS)
Degree(s) awarded: Master degree in Petroleum Economics (DNM) or Diplome d’Ingénieur.
PEM COURSES IN FRANCE

Credits:
At least 24 US Credits – 40 ECTS are required during the Spring and Summer Terms. A list of the courses is given in table below.
The 4 months work placement gains 20 ECTS credits and a term in a Partner University gains 20 ECTS credits.

What opportunities can the PEM Program offer the applicant?
IFP school graduates have a high job placement rate; in particular PEM graduates receive offers in three sectors:
  ➢ Oil & gas companies
  ➢ Energy & service companies
  ➢ Consulting, banking and international organizations (such as the UN, IEA).
The participants take with them a thorough understanding of the energy industry, and the dynamics of its technological, political, economic and environmental challenges.
Many graduates have been hired by BP, ExxonMobil, Gazprom, Lukoil, Shell, Total, Schlumberger, Statoil, Government Organisations (e.g. Finance, Energy ministries, etc) to name just a few.

PEM Courses (2015/2016)

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FOR FURTHER INFORMATION ON THE PARTNER UNIVERSITIES

➢ Audencia School of Management (France)
  Website: http://www.audencia.com/

➢ BI Norwegian School of Management (Norway)
  Website: http://www.bi.no/en/

➢ CEPMLP – University of Dundee (Scotland)
  Website: http://www.dundee.ac.uk/cepmlp/

➢ China University of Petroleum at Beijing (China)
  Website: http://www.cup.edu.cn/internationaloffice/en/

➢ Colorado School of Mines (USA)
  Website: http://econbus.mines.edu/

➢ ESCP Europe (France)
  Website: http://www.escpeurope.eu/

➢ ESSEC (France)
  Website: http://www.essec.edu/

➢ Gubkin University (Russia)
  Website: http://en.gubkin.ru/academics/degrees_and_programs/master/joint_master/

➢ Oklahoma University (USA)
  Websites: http://www.ou.edu/

➢ Texas A&M (USA)
  Websites: http://admissions.tamu.edu/

➢ University of Alberta (Canada)
  Website: http://www.ualberta.ca/

➢ University of Sao Paulo (Brazil)
  Website: http://www5.usp.br/english/
1. OBJECTIVE AND ORGANISATION OF THE PROGRAM

Program supervisor:

Arash FARNOOSH

Deputy coordinator:

Sidney LAMBERT-LALITTE
INTERNATIONAL COLLABORATIVE PROGRAM

PETROLEUM ECONOMICS AND MANAGEMENT
(PEM)

1.1. GENERAL OBJECTIVES

The International Collaborative Program in Petroleum Economics and Management is designed for students or professionals with degree in science, engineering or social science, seeking in-depth training to develop a commanding skill set petroleum techniques, petroleum economics and management.

Aimed at developing internationally-minded professionals able to take up managerial positions requiring multidisciplinary skills, the Program offers a unique opportunity to complement technical skills with managerial know-how and economic insight and to acquire real-world knowledge from a faculty with strong ties to industry, in activities like management, research and consulting.

Participants will gain international experience by studying in France, North/South America or Russia or other European countries and also through contacts with students, professionals and faculty from many countries.

On completion of the Petroleum Economics and Management Program and in particular at the end of the period spent at the IFP School (January - July), students are expected to:

- be able to take up a position requiring multidisciplinary skills in the energy sector,
- be intentionally minded and capable of teamwork in an international context,
- gain an understanding of the upstream and downstream energy sectors in their economic, commercial, financial and environmental dimensions (key economic data and characteristics, management tools, etc.) and technical dimensions for the student who choose the curriculum with technical courses (reservoir engineering, refining processes, etc.),
- be capable of using the main management and decision-making tools for making and justifying operational decisions.

1.2. TRAINING TECHNIQUES

These objectives are achieved through the use of a number of training techniques, including:

- Lectures with many examples
- Conferences given by experts of the industry and Professors from Universities
- Applied sessions
- Syndicate working on case studies and projects
- Individual assignments to reflect and critique current approaches
- Visit of flexible pipe factory, a refinery, a biofuel factory and a power generation plant.
1.3. CURSUS AND DEGREES AWARDED

The detail in terms of number of required courses and credits (ECTS) is given in 1.6

The length of the course and the degree awarded depend on the type of first degree that the student has obtained, his/her professional experience and the kind of cursus chosen:

- with two degrees in the case of a collaborative program taken at IFP School and Texas A&M University, Colorado School of Mines, The University of Oklahoma and Gubkin Russia State University of Oil & Gas;
- or in a single degree program with credits transferred from the University of Alberta, University of Dundee, University of Sao Paulo, BI Norwegian Business School, China University of Petroleum at Beijing, ESCP Europe, ESSEC or Audencia.

The duration is usually 16 months (minimum is 11 months and the maximum is 22 months).

1 - General Case

Students admitted to the School after 4 years of higher education (“bac+4”) with a degree such as a BSc from an American university or an MSc from a British university or students admitted after 5 years of higher education (“bac+5”) with a degree not in accordance with the standards of the “Commission des Titres d’Ingénieurs (CTI)” for French institutions or a degree considered equivalent by a recognized board for foreign institutions. They can be awarded a DNM (“Master’s degree in Petroleum Economics and Management”) after 16 months.

2 - Students with a “diplôme d’ingénieur” or equivalent

Students concerned are those admitted to the School with a degree corresponding to 5 years of higher education (“bac+5”) in accordance with CTI standards or equivalent. These students can be awarded the “diplôme d’ingénieur (DI)” after 16 months, including 4 months spent on work placement (single degree) or 20 months (work placement included) in the case of a double degree. This period in industry may be waived if the student already has at least 4 months of professional experience accepted by the IFP School as equivalent to the industry placement. To get this degree, the two technical courses (Upstream and Downstream) are compulsory.

3 - Students admitted under a “bac+4” agreement

These are students from schools or universities that award an engineering degree in accordance with CTI standards or equivalent and who are admitted to the IFP School at “bac+4” (i.e. at the end of their penultimate year of a 5-year engineering course) under an agreement signed by their school and IFP School. In the PEM Program, they can be admitted only if they have spent 1 year abroad (année de césure).

They can be awarded the “diplôme d’ingénieur (DI)” after 22 months (16-month Program followed by a 6-month work placement validated by the IFP School).

Internship/Work Placement period: the student is required to submit monthly reports. The report should be more than a simple activity report (i.e. Technical report with a description of the work status) – it should also include a discussion of the student’s non-technical experiences in industry, and any difficulties that the student has come across. The internship is assessed on the basis of the evaluation of the company supervisor and the IFP School coordinator and the pertinence and quality of work carried out, the personal and professional skills demonstrated by the student during the internship and the final report to be submitted at the end. In addition, students preparing the DNM must give an oral presentation (or at least a telephone interview for students abroad).
Degrees from the partner University

In the case of a collaborative program, the student can get also the degree of the Partner University:

- Master of Science in Mineral & Energy Economics from Colorado School of Mines
- Master of Engineering from Texas A&M University
- MBA in Managerial Economics from Oklahoma University
- Master of Science in Oil & Gas Economics and Management from Gubkin University

1.4. PROGRAM STRUCTURE

The program consists of 4 different Terms (double degree):

- **A first Fall Term** (from end of August year n to end of December year n) at Colorado School of Mines, Texas A&M University, Oklahoma University or Gubkin University
- **A Spring Term** at IFP School (from January year n+1 to end of April year n+1)
- **A Summer Term** at IFP School (from April year n+1 to end of July year n+1)
- **A second Fall Term** (from end of August year n+1 to end of December year n+1) at Colorado School of Mines, Texas A&M University, Oklahoma University or Gubkin University

It is also possible to spend a Spring and a Summer Terms in IFP School, and study a Fall semester either in University of Alberta, University of Dundee (Centre for Energy, Petroleum and Mineral Law and Policy), University of Sao Paulo, BI Norwegian School of Management, China University of Petroleum at Beijing, ESCP Europe, ESSEC or in Audencia. In that case, the student gets only the IFP School degree.

The program in IFP School is divided into three main parts:

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<td>Strategic Marketing &amp; Management (2)</td>
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<td>Economics</td>
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<td>Energy</td>
<td>Global Energy Outlook (1)</td>
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<td>Production / Reservoir engineering (1)</td>
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<td>Upstream Management (1)</td>
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<td>Downstream Management &amp; Sustainable Energies (2)</td>
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<td>Energy Markets &amp; Trading (2)</td>
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<td>Quantitative tools</td>
<td>Efficiency Analysis (1)</td>
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<td>Decision Sciences (2)</td>
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<td>Advanced Econometrics (2)</td>
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<td>Term Paper (1-2)</td>
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(1) : Spring Term (2) : Summer Term
1.5. PROGRAM CONTENT

➢ BUSINESS & MANAGEMENT

GENERAL OBJECTIVES

On completion of the relevant teaching units, students will be capable of handling the main managerial, commercial and financial tools used in business, and of applying them in an overall manner. In simple situations they will be able to assess the financial position of a company, to draw up a marketing policy, to prepare investment decisions and to carry out an economic analysis applied to the energy sector. Therefore, they will feel more comfortable to deal with complexity and change.

GENERAL CONTENT

- Financial Management & Business Accounting
- Teamwork across cultures
- Negotiation and Communication
- Strategy of the companies
- Marketing

➢ ENERGY ECONOMICS & TECHNIQUES

GENERAL OBJECTIVES

On completion of the relevant teaching units, students will be capable of:

- analyzing the geopolitical characteristics of the Energy industry
- describing the main economic characteristics of the different oil and gas activities
- building their own model of investment analysis including the influence of technical parameters
- communicating a technical study in simple cases

GENERAL CONTENT

- Energy Economics and Energy Geopolitics
- Upstream Management and Portfolio Management
- Production and Reservoir Engineering
- Refining Techniques and Management, petrochemicals
- Gas, Power, Coal and Renewables
- CO2 Economics & Sustainable Energies
- Oil and petroleum products Trading and Hedging Techniques

➢ TOOLS

GENERAL OBJECTIVES

On completion of the relevant teaching units, students will be capable of performing quantitative analysis of the energy sector.

GENERAL CONTENT

- Statistical approaches for measuring and inferring about the economic performances of firms
- Linear programming & non-linear programming theory and applications
- Econometric models in energy economics and finance.
### 1.6. LIST OF TEACHING UNITS

#### CREDITS AND TEACHING UNITS REQUIRED

- You need to take at least 24 US credits – 40 ECTS during the Spring and Summer Terms. A 4-month internship in a company will add 20 ECTS and an academic term in a Partner University 20 ECTS.
- Compulsory teaching units for each student: PEM 4, PEM 5, PEM 7 (At least two courses must be taken between PEM 7A, PEM 7B & PEM 7C and the third one is optional).
- Compulsory teaching units for the students with TAMU: PEM 9 and PEM 10 (6 US credits),
- Compulsory teaching units for the students with CSM: PEM 13 (2 US Credits)

The following table gives the list of the teaching units with the title, ECTS credits and US credits allocated, name of the coordinator and the type of grading exams.

<table>
<thead>
<tr>
<th>Teaching Unit</th>
<th>Term</th>
<th>Hours</th>
<th>US/ECTS</th>
<th>Coordinator</th>
<th>For Grading</th>
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<tbody>
<tr>
<td><strong>Business and Management</strong></td>
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<tr>
<td>PEM 1 : Business Accounting</td>
<td>1</td>
<td>43</td>
<td>2/4</td>
<td>S. Bianchi</td>
<td>Project + Exams</td>
</tr>
<tr>
<td>PEM 2 : Strategic Marketing &amp; Management</td>
<td>2</td>
<td>54</td>
<td>3/6</td>
<td>J. Smith</td>
<td>Quiz + Exams</td>
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<tr>
<td><strong>Energy</strong></td>
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<tr>
<td>PEM 3 : Term Paper</td>
<td>2</td>
<td>41</td>
<td>2/4</td>
<td>A. Farnoosh / S.Lambert-Lalitte</td>
<td>Paper + Presentation</td>
</tr>
<tr>
<td>PEM 4 : Global Energy Outlook</td>
<td>1</td>
<td>90</td>
<td>2/4</td>
<td>J.P. Favennec</td>
<td>Presentation + Exam</td>
</tr>
<tr>
<td>PEM 5 : Upstream Management</td>
<td>1</td>
<td>72</td>
<td>4/8</td>
<td>N. Bret-Rouzaut</td>
<td>Exam</td>
</tr>
<tr>
<td>PEM 6 : Evaluation of Projects</td>
<td>1</td>
<td>57</td>
<td>4/8</td>
<td>N. Bret-Rouzaut</td>
<td>Quiz + Case studies + Exam</td>
</tr>
<tr>
<td>PEM 7 : Downstream Management</td>
<td>2</td>
<td>47</td>
<td>6/12</td>
<td>A. Farnoosh</td>
<td>Exam + Quiz + Projects</td>
</tr>
<tr>
<td>PEM 7A : Midstream &amp; Refining</td>
<td>2</td>
<td>50</td>
<td>2/4</td>
<td>A. Farnoosh</td>
<td>Project + Exam</td>
</tr>
<tr>
<td>PEM 7B : Gas &amp; Power</td>
<td>2</td>
<td>53</td>
<td>2/4</td>
<td>A. Farnoosh</td>
<td>Simulation + Exam</td>
</tr>
<tr>
<td>PEM 7C : CO₂ Economics</td>
<td>2</td>
<td>35</td>
<td>2/4</td>
<td>S. Lambert-Lalitte</td>
<td>Exam + Case Study</td>
</tr>
<tr>
<td>PEM 8 : Energy Markets &amp; Trading</td>
<td>2</td>
<td>43</td>
<td>2/4</td>
<td>A. Farnoosh / S. Lambert-Lalitte</td>
<td>Exam + Case Study</td>
</tr>
<tr>
<td>PEM 9 : Reservoir Engineering</td>
<td>1</td>
<td>81</td>
<td>4/8</td>
<td>G. Glotin</td>
<td>Quiz + Case Study + Exam</td>
</tr>
<tr>
<td>PEM 10 : Refining</td>
<td>2</td>
<td>33</td>
<td>2/4</td>
<td>C. Le Mirronet</td>
<td>Exam</td>
</tr>
<tr>
<td><strong>Quantitative tools applied to Energy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEM 11: Efficiency Analysis</td>
<td>1</td>
<td>42</td>
<td>2/4</td>
<td>L. Simar</td>
<td>Report + Presentation</td>
</tr>
<tr>
<td>PEM 12: Decision Sciences</td>
<td>2</td>
<td>17</td>
<td>1/2</td>
<td>P. Cowling</td>
<td>Exam</td>
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<tr>
<td>PEM 13: Advanced Econometrics</td>
<td>2</td>
<td>42</td>
<td>2/4</td>
<td>F. Lantz</td>
<td>Project + Exam</td>
</tr>
</tbody>
</table>
### 1.7. HANDOUTS

Handouts are given to the students for each course. For some courses, a textbook will be available for each student during the Term (to be given back at the end of the course). In addition, reference books are mentioned in the descriptive sheet of each course.

### 1.8. THE PERSONALIZED TRAINING PLAN

With the personalized plan, students can play an active role in defining their training and ensure that their training curriculum at IFP School is consistent with their career plans. This personalized plan, described in the Students’ Handbook, is designed to lend greater meaning to the training process and enhance each student’s motivation and sense of responsibility.

Each student is assigned an educational advisor from among the teaching staff. This advisor meets with the student on two or three occasions during the year. A guide to these meetings has been prepared for the benefit of both advisors and students. These meetings are based on a “Personalized Plan” document that serves as a framework for the meeting and a resource to help the student prepare in advance. A user’s guide is provided to the student.

### 1.9. SKILLS DEVELOPMENT AND THE “CAREER PATHS”

In the second part of this syllabus you will find all of the teaching Units (TUs) offered at various times of the year.

It is important to note that the School’s objective is to incorporate all of these TUs into a vocational skills development program designed to give students the skills they need to enter any of the disciplines typically open to the School’s graduates.

To lend structure to this skills development program and define the links between TUs and specific skills, we have defined standard “career paths”.

---

<table>
<thead>
<tr>
<th>Degree</th>
<th>Spring and Summer terms</th>
<th>Term with a Partner University</th>
<th>4-month Internship</th>
<th>Number of ECTS</th>
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<tbody>
<tr>
<td>IFP Degree (Ing.)</td>
<td>40</td>
<td>20</td>
<td>with experience</td>
<td>60</td>
</tr>
<tr>
<td>IFP degree (Ing.) without exp. / DNM</td>
<td>40</td>
<td>20</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>IFP degree (Ing.) without exp. (bac+4 cézure) / DNM</td>
<td>40</td>
<td>20</td>
<td>22 with 6-month internship</td>
<td>90</td>
</tr>
<tr>
<td>IFP (Ing./DNM) + Partner Degrees</td>
<td>40</td>
<td>40</td>
<td>with experience (Ing.)</td>
<td>80</td>
</tr>
<tr>
<td>IFP (Ing. Without experience) + Partner Degrees</td>
<td>40</td>
<td>40</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>
For example we have developed seven standard “career paths” for the PEM program:

1. Project Evaluation
2. Energy & Natural Resources Analyst
3. Energy & Commodity Finance
4. Project cost Control
5. Petroleum Engineer
6. Energy Consulting
7. Project financing

and defined an associated “skills glossary”.

This Graduate Program is designed to help you acquire the necessary skills to pursue these various occupations.

You can review all of the career paths and the skills glossary at the School’s e-campus site (http://ecampus.ifp-school.com).

For each career path, the sites indicates the link between the skills acquired at the School (the TUs taught) and at the Partner Universities and those that can be acquired during company internships or special modules.

1.10. MAIN PARTNERS

- ARAMCO
- BCG CONSULTING
- BNP PARIBAS
- BRUNEL UNIVERSITY LONDON
- CREDIT AGRICOLE-CIB
- CATHOLIC UNIVERSITY OF LOUVAIN-LA-NEUVE
- CHATHAM HOUSE
- COMMODITY REACH CONSULTING
- ESC DIJON
- ESCP EUROPE
- EDF
- FRANCE BUSINESS SCHOOL
- GDF SUEZ
- GWA ASSOCIATES
- HERBERT SMITH FREEHILLS
- IFP ENERGIES NOUVELLES
- IFP TRAINING
- IMPERIAL COLLEGE OF LONDON
- INTERNATIONAL ENERGY AGENCY
- INIS ALGA
- INNOVEOX
- JOHNS HOPKINS UNIVERSITY
- OHIO STATE UNIVERSITY
- PRINCEPS
- RENNES INTERNATIONAL SCHOOL OF BUISNESS
- SCHNEIDER ELECTRIC
- SHELL
- SUMITOMO MITSUI BANKING CORPORATION
- TOTAL
- UNITED NATIONS
- UNIVERSITY OF BATH
- UNIVERSITY OF YORK
- WD COOPERATION
2. OUTLINE OF TEACHING UNITS
PEM 1

BUSINESS ACCOUNTING

Coordinator: Sébastien Bianchi

OBJECTIVES

On completion of the PEM 1 course, students will be able:

- to understand the different financial functions of the firm
- to explain the main accounting principles in the financial statements of a company,
- to analyze financial statements in terms of profitability, solvency and financial structure,
- to use management accounting tools in order to control costs and to make business decisions

LECTURER

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturer</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Accounting</td>
<td>Sébastien BIANCHI</td>
<td>IFP SCHOOL</td>
<td>15</td>
<td>Spring</td>
</tr>
<tr>
<td>Project Financing</td>
<td>Investment Banking Expert</td>
<td>Amundi</td>
<td>6</td>
<td>Spring</td>
</tr>
<tr>
<td>Evaluation in Oil &amp; Gas</td>
<td>Investment Banking Expert</td>
<td>Enexpans</td>
<td>6</td>
<td>Spring</td>
</tr>
<tr>
<td>Mergers &amp; Acquisition</td>
<td>Consultant</td>
<td>Consultant</td>
<td>3</td>
<td>Spring</td>
</tr>
</tbody>
</table>

TOTAL HOURS IN CLASS: 33 h

- **Course sessions**: 10 x 3 h = 30 hours
- **1 Exam** = 3 hours.

This course also requires students to independently complete an online e-learning module (10 hours)

CREDITS US: 2
CREDITS ECTS: 4

TRAINING TECHNIQUES

E-learning module introducing accounting fundamentals
In class case studies and examples
Presentations by guest speakers
Group work

TEXTBOOK

GRADING CRITERIA

- One group work (30%)
- One final exam (70%)

OUTLINE

1. Introduction to financial accounting
   1. Accounting principles (GAAP : Generally Accepted Accounting Principles)

2. Corporate Finance
   2.1. Financial Analysis
       1. Margin Analysis
       2. Working capital and Capex Analysis
       3. Financing Analysis
       4. Profitability Analysis

   2.2. Oil& Gas valuation
       guest speaker

   2.3. Investments Analysis
       guest speaker

3. Management Accounting
   1. Process costing : Cost-volume-profit-analysis / Activity-based costing
   2. The budgeting process
   3. Management control systems and dashboards
PEM 2

STRATEGIC MANAGEMENT

Coordinator: Jamie SMITH

OBJECTIVES

At the end of the course, the students will be able to:

- Recognize the essential elements of Strategic Management within the context of the Energy and motor Industries.
- Situate marketing strategy within the wider business strategy.
- Understand the building blocks of the current international marketing environment, stressing macro-determinants such as culture alongside pure business factors such as global integration and competition.
- Examine managerial marketing along the following lines: market entry methods, international marketing research and strategy, the transition from domestic to international and global marketing mix, international marketing planning, organization, operations and communication.
- Evaluate key strategic marketing themes that are highly relevant to the energy sector (e.g. CSR)

COURSE PROGRAM

First Part

- Foundations and origin of the notion of Strategy
- Strategic vision, company mission and strategic activity areas
- External diagnosis (PESTLE, scenario method, Porter five forces analysis, industry life cycle, growth-share (BCG2, GE) matrix, and identification of the key factors in success
- Internal diagnosis (value chain, resource and skills analysis)
- Building a competitive edge: generic strategies, experience curve...
- Strategic tracks (specialization, diversification, integration, internationalization)
- Organization of strategic thinking

Second Part

- Understand the strategic concepts of international marketing strategy
- Assess the core competencies of the firm, how industries change and how to develop competitive advantage.
- Evaluate what decisions guide the product/market portfolio and how to create value for customers.
- Evaluate the choice of strategies and adaptations of the major elements of international marketing mix
- Develop marketing recommendation to case study problems

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturers</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essentials of Strategic Management</td>
<td>Jamie SMITH</td>
<td>France Business School</td>
<td>24</td>
<td>Summer</td>
</tr>
<tr>
<td>Marketing Strategy</td>
<td>Academic</td>
<td>ESC Dijon</td>
<td>18</td>
<td>Summer</td>
</tr>
</tbody>
</table>
TOTAL HOURS IN CLASS: 45 h
- Lectures: 42 hours
- Exam = 3 hours

CREDITS US: 2
CREDITS ECTS: 3

TEXTBOOK
- IFP School Handouts.

GRADING CRITERIA
- Courses (J. Smith): 60% of the grade.
  - Continuous assessment: Quiz (10%) / Group Assignments (40%)
  - Final Exam: 50%
    A case study will be the basis of the final exam (application of course concepts)
- Group project: 40% of the grade.

[Course outline on following pages]
OUTLINE

1. First Part (J. SMITH)

Day 1
Subjects:
- Strategic Management Principles: analyzing the environment and the company:
  - Layers of the Business Environment:
  - From Micro to Macro Analysis
  - SLEPT analysis
  - Porter’s five Forces & Porter’s diamond

Activities:
Applying models to businesses, industries and national economies
Disruptive entrepreneurs: An interview with Eric Ries (video)

Readings:
Chapter 2 (Aaker & McLoughlin) – An overview of Strategic Marketing Management

Day 2
Subjects:
- Value Concepts: The 3Vs
- Strategic Management Capabilities:
  - Experience curves
  - The Value Chain and Value Network
  - The marketing Information System

Activities:
Class activity of the 3Vs (Strategic perspective)
Dashboard versus the Scorecard (Operational Perspective)

Readings:
Chapter 10 (Aaker & McLoughlin) – Value, Focus, Innovation Customer Relationships

Day 3
Subjects:
- Managing the Portfolio: BCG & GE models
- A case study on the competitive strategies pursued in the Oil and Gas industries

Activities:
Applying Strategic Marketing Models

Readings:
Chapter 7 (Aaker & McLoughlin) – Internal Analysis

Day 4
Subjects:
- Quiz
- The Harvard Case Method:
  - Problem Statements
  - Situation Analysis
  - Evaluation of Alternatives
  - Implementation

Activities:
Case Study: Green Light Reshuffle: Phasing out incandescent bulbs in France

Readings:
Chapter 9 (Aaker & McLoughlin) – Strategic Options Quality and Brand Equity
2. **Second Part (Academic)**

**Day 1**

**Subjects:**
- Presentation of the course
- Advantage and disadvantages of going global
- Practices in the decision to go international
- Global trading environment
- Developed vs. developing economies
- Theory of international marketing
- Standardization vs. Adaptation
- Market Selection
- Entry Market Strategies

**Activities:**
Case study with podcast and video support

**Readings:**
Hollensen Chapter 1, 3 ; Keegan and Green Chapter 1

**Day 2**

**Subjects:**
- Products and services, innovation and launching of new products, managing the life cycles, range width and depth policies, brand management
- Pricing policies
- Distribution strategy, Comparison B2B and B2C, Different concepts of shopping and e-commerce, Choice of distribution channels in different countries
- Communication strategy

**Activities:**
Case Study incl. podcast and video support

**Readings:**
Keegan and Green Chapter 9-12

**Day 3**

**Subjects:**
- Contemporary Themes:
  - CSR strategies
  - Internal Marketing
- Course Review
- Student Group Presentations

**Activities:**
Exercises, Group Presentations

**Readings:**
Handouts
The Term Paper is an optional work within the Petroleum Economics & Management program curriculum intended to allow participants to apply the knowledge and skills acquired during the spring and summer courses in an actual business or research project.

The Term Paper is an individual project (it can be also a small-group project of 2-3 students according to the content and size), designed to provide a response on business, techno-economic or economic problems related to the energy sector. A wide range of topics (oil, coal, gas & electricity) can be studied.

The length of the project is normally one term (it can be also two terms if the students have already solid and well-structured ideas about what they want to do). It is based on an independent research and/or analysis of one of the themes either suggested by the student or by the supervisor(s). Students are invited to find a subject and a supervisor during dedicated sessions.

At the end of the Master’s program, each student will present for about 20 minutes: the objective, the approach, the methodology, the bibliography (in case of research-based subjects) and finally the results with its analytical and/or practical interpretations and applications.

This presentation will be followed by a question and an answer period (lasting about 20 minutes) in front of the Jury.

The Term Paper must fulfill the requirements of:

- Written in English
- Must be parsed with using anti-plagiarism software
- Must be chosen between either Business work or Research work:
  - Business work (around 20 pages excluding appendices), including
    - A clear title for your project
    - Identification of the exact problematic and objectives
    - Very well structured road map so as to reach the objectives
    - Bringing your key arguments in a structured manner
    - A short description of tools and/or methodology used
    - Presentation and validation of recommendations/solutions
    - Presentation of strengths and weaknesses of your recommendations
    - Conclusion and if necessary, additional suggestions
Research work (maximum 40 pages excluding appendices and bibliography), including
- A clear title for your project
- A clear research problem/project objective
- A short description of how you want to proceed
- A well-structured methodology and clear research design
- Relevant theories and theoretical concepts/models
- An account of the data collection and data validation methods, data sources
- An account of the analytical methods used to validate the findings
- An account of the methods used to develop recommendations/solutions to resolve the research problem and achieve the project objective
- Conclusion and if necessary, brief description of needed further research
- Bibliographies

IMPORTANT NOTICE

Once this teaching unit has been taken by the student, he/she must send to the referent professor(s) a detailed outline within 15 days.

The complete report must be sent at least one week before the defense session (1 electronic, 3 hard-copies).

GRADING CRITERIA

Defense/Presentation: 40% of the grade
Written Report (Research work or Business work): 60%
PEM 4

GLOBAL ENERGY OUTLOOK
Coordinator: Jean-Pierre FAVENNEC

OBJECTIVES
At the end of the course, the participants will:

- Obtain a broad view of:
  - energy consumption (global, per country), energy production (by energy source), energy reserves
  - main geopolitical characteristics of the Energy Industry (relationships between importing and exporting countries; competition between exporting countries; the place and role of OPEC), the development of this industry and the constrains (like energy consumption and reserves) associated with the various energies

- Have an understanding of the:
  - future energy consumption
  - evolution of energy prices

COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturers</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
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<tr>
<td>Energy Scene</td>
<td>Jean-Pierre FAVENNEC Consultant</td>
<td>WD Cooperation IFP Training</td>
<td>27</td>
<td>Spring</td>
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<tr>
<td>Microeconomics &amp; Macroeconomics</td>
<td>Academic</td>
<td>ESCP EUROPE</td>
<td>18</td>
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<tr>
<td>applied to the energy sector</td>
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</table>

TOTAL HOURS IN CLASS: 47 h

- Lectures + Presentations: 45 hours
- Exam: 2 hours
- International Energy Agency visit: 0.5 day
- International Oil Summit in Paris: 1 day

CREDITS US: 2
CREDITS ECTS: 4

TRAINING TECHNIQUES:
Lectures given by Experts

TEXTBOOK
- IFP School Handouts
BIBLIOGRAPHY


GRADING CRITERIA

- 1 Research Paper (5-10 pages) with Oral Presentation: 50% of the grade.
- 1 Test (without document): 50% of the grade.

OUTLINE

Energy economics
Energy prices. Evolution of the oil industry. Oil Prices. Discussion: Oil prices in 2026
The players on the energy scene: OPEC, oil companies, consuming countries
Energy Policy objectives

Energy geopolitics in America (North and South)
Presentations: Situation in North America (NAFTA) + situation in South America

Energy geopolitics in Europe. The role of Russia. The role of Africa
Presentations: Situation in Europe + situation in CIS + situation in Africa

Energy geopolitics in the Middle East and Asia
Presentations: Situation in the Middle East + situation in Asia

Energy security.
Presentations: The US case + the European case.

Energy industrial organization, energy markets, energy prices.
Presentations: Organization in the oil and gas sector.
PEM 5

UPSTREAM MANAGEMENT

(Business, Strategy and Legal)
Coordinator: Nadine BRET-ROUZAUT

OBJECTIVES

At the end of the course the students will get:

- an understanding of the oil & gas Industry in all its aspects: reserves, players (IOC, NOC, Contractors), investments, costs, benchmarking, etc.
- a practice of calculation of the taxes in a Royalty System or Production Sharing Contract
- a high level overview of the legal and contractual framework of two petroleum producing countries (Angola which has a PSA type regime and the UK which uses concessions) and how oil companies work together through joint ventures
- an introduction to LNG, gas and oil sale and purchase agreements; and pipeline agreements
- a knowledge of International laws on corruption and bribery; International sanctions laws; International transparency laws (publish what you pay); International boundary disputes; Bilateral investment treaty protection/ICSID and ways in which foreign investors are protected; International arbitration.
- an experience in E&P decision evaluation techniques when risk has to be coped with and a basic understanding of the different strategies applied in the upstream business (negotiation of contracts included)

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturers</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
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<tr>
<td>Upstream Industry</td>
<td>Nadine BRET-ROUZAUT</td>
<td>IFP School</td>
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<td>Spring</td>
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<td>Exploration Strategy</td>
<td>Consultant</td>
<td>Consultant</td>
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<td>Denbury Case Study</td>
<td>Investment Banking Expert</td>
<td>BNP Paribas</td>
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<td>Legal framework and International Laws</td>
<td>Industry Expert</td>
<td>Herbert Smith Freehills</td>
<td>12</td>
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<tr>
<td>Internat. Negociation</td>
<td>Industry Expert</td>
<td>Inis Alga</td>
<td>12</td>
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</tr>
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</table>

TOTAL HOURS: 69 h

- Lectures, 48 hours
- Denbury Case Study, 18 hours classroom + analysis/writing of the report
- 1 Quiz Upstream Management (1 hour); 1 Exam Upstream Strategy (2 hours) : 3 hours

CREDITS US: 4
CREDITS ECTS: 8

TRAINING TECHNIQUES

Lectures by Experts, Applications and Case-study.

TEXTBOOK

IFP School Handouts.
BOOK: “OIL AND GAS EXPLORATION AND PRODUCTION”, EDITIONS TECHNIP
BIBLIOGRAPHY
To be given during the first lecture

GRADING CRITERIA

- Quiz: 40% of the grade
- Denbury Case-Study with written report: 30% of the grade
- Exam Exploration Strategy: 30% of the grade

OUTLINE

Upstream Industry
- Key figures in upstream, the main challenges, players: IOC, NOC, Independents, Contractors
- Oil Reserves, Peak oil
- Investments and Costs. Accounting and Performance Measures: investments and costs, finding & development costs, booked reserves, etc.
- Legal and Fiscal aspects: concession – PSC / service contacts

Exploration Strategy
- Upstream strategies, future trends: “frontiers”, technology, gas specificity
- Project evaluation and decision-making. Risk assessment. Case-history
- Summary of petroleum systems and risk qualifiers
- Use of log-normality in dealing with natural parameters
- Field size distributions
- Prospect and play analysis. Reserve estimation
- Portfolio inventories
- Tools of choice for ranking and selection
- Performances versus predictions. Performance improvement

Upstream Legal and Contractual Framework
- The PSA in Angola
- The license regime in UK
- LNG, gas and oil sale and purchase agreement; pipeline agreement
- International laws on corruption and bribery; International sanctions laws; International transparency laws (publish what you pay); International boundary disputes; Bilateral investment treaty protection/ICSID and ways in which foreign investors are protected; International arbitration.

International Business Negotiation (Marc BERETTA)
The objective is to learn how to become a more effective negotiator. We will start by the preparation process of a negotiation, which is a key issue. Then, we will spend time on the meeting itself, focusing on the process, the techniques and, of course the appropriate behavior. Then, we will see what makes an international negotiation different. Finally, the follow up.
EVALUATION OF PROJECTS
(Upstream Finance & Portfolio Management)
Coordinator: Nadine BRET-ROUZAUT

OBJECTIVES
At the end of the course the students will:
1.1. gain a good practice of the standard methods of investment analysis
1.2. be able to build their own model and use a model acquired by a company of upstream investment analysis taking into account fiscal aspects, inflation, financing mix and risk to take a decision related to the development of an oil field
2. know the fundamentals of Project Financing and when project financing can be used
3.1. get acquainted with a broad spectrum of producing assets & related deals (in general terms)
3.2. understand the problematic of optimization (physical: reserves), economics (valuation, profitability), adjustment variables (like WI’s), constraints (budget, growth of reserve base ...).
3.3. make a judgment of “quality”: is the group satisfied with the current portfolio (near to, or far from, optimum)?
3.4. recommend actions taking uncertainties into account throughout the whole process

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturers</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
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<tbody>
<tr>
<td>Capital Budgeting</td>
<td>Industry Experts</td>
<td>Total</td>
<td>27</td>
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<tr>
<td>Upstream Project Finance</td>
<td>Investment Banking Expert</td>
<td>Sumitomo Mitsui Banking Corporation Total</td>
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<tr>
<td>Portfolio Management</td>
<td>Industry Expert</td>
<td>IFP School</td>
<td>21</td>
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</tbody>
</table>

TOTAL HOURS: 57 h

- Lectures: 39 hours
- Capital Budgeting Case-study: 9 hours computer calculations + analysis/writing of the report
- Portfolio Management Project: 9 hours personal work

CREDITS US: 4
CREDITS ECTS: 8

TRAINING TECHNIQUES

Lecture by Experts, Applications and Case-study.
TEXTBOOK

IFP School Handouts.

BIBLIOGRAPHY

GRADING CRITERIA

Case-Study (Capital Budgeting): 50% of the grade.
Project (Portfolio Management): 50% of the grade.

OUTLINE

Capital Budgeting

- Introducing: cash flow schedule / discount rate
- Criteria: net present value (NPV) / internal rate of return (IRR) / pay out time
- Fiscal impact: depreciation rate and profitability / after tax NPV, IRR
- Taking inflation into account: current money/constant money
- Investment and financing mix: overall and equity return and capital rationing
- Shadow interest method

Project Financing

1. Introduction
2. Fundamentals of Project Financing: risk allocation
3. Financing Oil & Gas projects: Reserve base Lending
4. RBL Methodology & Process
5. Conclusion

Portfolio Management Case-Study

- Introductory presentation: case objectives, portfolio composition, methodology (principles of optimization, mathematical & statistical tools, practical use of software), deliverables...
- Work in groups on the case; “Coaching” by instructors
- Preparation of groups’ conclusions & presentations
- Groups’ presentations and discussions
PEM 7

DOWNSTREAM MANAGEMENT & SUSTAINABLE DEVELOPMENT

Coordinators: Arash FARNOOSH & Sidney LAMBERT-LALITTE

At least two courses must be taken between PEM 7A, PEM 7B & PEM 7C and the third one is optional

TOTAL CREDITS US: Min 6, Max 9
TOTAL CREDITS ECTS: Min 12, Max 18

PEM 7A

MID & DOWNSTREAM BUSINESS: OIL REFINING, PETROCHEMICALS & PRODUCTS

Coordinators: Arash FARNOOSH & Jean-Pierre FAVENNEC

OBJECTIVES

The objectives of this course are to:

- Understand the main economic characteristics of the refining and petrochemical industries and the economic mechanisms of refining operations, with the concepts of refining margins and volatility.
- Learn the linear programming theory and more precisely the simplex algorithm, a widely used algorithm to solve the linear programming models.
- Understand the importance and meaning of marginal costs (dual values).
- Be able to write a linear programming model and analyze the optimal solution and validity limits and use industrial software to optimize the operations of a conversion refinery

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturers</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Refining</td>
<td>Jean-Pierre FAVENNEC</td>
<td>IFP School</td>
<td>6</td>
<td>Summer</td>
</tr>
<tr>
<td>Refining project</td>
<td>Industry Expert</td>
<td>Aramco</td>
<td>12</td>
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</tr>
<tr>
<td>Petrochemicals and Pipeline</td>
<td>Consultant</td>
<td>Consultant</td>
<td>9</td>
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<tr>
<td>Optimization (LP)</td>
<td>Academic</td>
<td>York University</td>
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<td></td>
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</tbody>
</table>

TOTAL HOURS IN CLASS: 44 h

- Lectures: 30 h
- Projects: 12 h
- Exam: 2 h

TRAINING TECHNIQUES

Lectures given by academics and industrial experts. Optimization Project.
TEXTBOOK

IFP School Handouts.

GRADING CRITERIA 7A

- **Refining Project**: 40% of the grade.
- **Linear Programming Exam**: 60% of the grade.

OUTLINE

Refining Management and Economics (1 day)

- Flexibility/limitations – current refining context – refining costs.
- Refining margins: various margins according to crude oil choice, complexity, location, etc.
- Costs versus margins – Profitability of the refining industry.
- Constraints: products slate evolution, environmental constraints and products qualities.
- Integrated companies versus independents.

Refining Project (2 days)

This project shows students how to use industrial computer software to optimize the operations of a conversion refinery. Each working group of three or four students has to run and analyze two standard annual production plans for a typical refinery before optimizing its own production plan. Common to all the working groups, the first two plans are set up to familiarize students with the LP refining model (input data and output results) and the software (LP matrix generator and the optimization software). Then, each working group has to build its own case; by modifying the crude oil supply, the process unit availability and the oil product demands, and to optimize it by selling and/or purchasing some oil products.

Petrochemicals and Oil-products Marketing (1 day)

- Introduction on refining and links to petrochemicals.
- Main characteristics of petrochemicals business.
- Strategies and economic factors for feedstock supply.
- Principal components of petroleum products.
- New trends in market structure and products characteristics.
- Oil products markets and sales channels.

Linear Programming (2.5 days + 1 exam: 0.5 day)

- Introduction to linear programming; definition of the problem, graphic resolution.
- General formulation of a linear program, basis, canonical form.
- Resolution by the tableau method / by the simplex method.
- Duality, relationship between primal and dual.
- Formulation of a minimization problem, finding an initial basis.
- Economic interpretation of results: marginal costs, marginal rates of substitution, etc.
- Specific cases: degeneracy, equality constraints, bounded variables.
- Resolution algorithms: revised simplex method, interior point methods.

BIBLIOGRAPHY

- Dantzig G. & Thapa M. (2003), Linear programming, Springer Verlag.
PEM 7B

GAS & POWER BUSINESS
Coordinator: Arash FARNOOSH

OBJECTIVES

The objectives of this course are to:

- Get an overview of the natural gas chain and an understanding of gas market structures and its fundamental characteristics, costs, contracts and pricing, both upstream and downstream.
- Evaluate the techno-economic issues of electricity production, transmission and distribution.
- Get a general knowledge coal industry from mining till final usage.

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturer</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>Natural Gas Economics &amp; Management</td>
<td>Industry Expert</td>
<td>GDF SUEZ</td>
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<td>Summer</td>
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<tr>
<td>Electric Power Economics &amp; Management</td>
<td>Industry Expert</td>
<td>EDF R&amp;D</td>
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<td></td>
<td>Arash FARNOOSH</td>
<td>IFP School</td>
<td>6</td>
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</tr>
<tr>
<td>Coal Industry &amp; market</td>
<td>Consultant</td>
<td>Consultant</td>
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<tr>
<td>US Markets &amp; Energy Storage</td>
<td>Academic</td>
<td>Ohio State University</td>
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<tr>
<td>Electricity Market Simulation</td>
<td>Arash FARNOOSH</td>
<td>IFP School CESIM</td>
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</table>

TOTAL HOURS IN CLASS: 56 h

- Lectures: 54 h
- Project: 12 h
- Exam: 2 h

TRAINING TECHNIQUES

Lectures given by academics and industrial experts.
Market Simulation Tools.

TEXTBOOK

IFP School Handouts.

GRADING CRITERIA 7B

- Electricity Simulation Game: 30% of the grade.
- Final Exam: 70% of the grade.
OUTLINE

Coal
- Coal Industry fundamentals.
- Production, transportation and market.

Gas
- Natural gas industry fundamentals: Production, processing, liquefaction, storage, transportation and distribution. Costs and comparison between oil chain and gas chain.
- Natural gas market structure: Gas monopolies in emerging markets and liberalization in mature markets, LNG. Emergence of spot markets, price risk, and future markets.
- Natural gas marketing: netback pricing and upstream natural gas contracts (take-or-pay).

Power
- Power generation means (oil, coal, gas, nuclear and renewable) and electricity transmission
- Total cost and levelized cost of electricity, Supply and demand equilibrium
- Network, distribution, transportation tariffs and black outs
- Smart grids and metering, distributed generation and micro-grids
- Market and institutions : Liberalization, regulation and deregulation

Electricity Simulation Game (2 days)
SimPower is a web-based electric utility management simulation game that focuses on the dynamic market behavior of the electricity markets. Participants work in teams and meet in direct competition against other teams. SimPower combines the dynamics of electricity supply and demand and illustrates how customers and competitors influence the company’s business.

BIBLIOGRAPHY
PEM 7C

CO₂ ECONOMICS & SUSTAINABLE ENERGIES
Coordinator: Sidney LAMBERT-LALITTE

OBJECTIVES

The objectives of this course are to:

▪ Understand the main factors affecting climate and their economic implications
▪ Get an overview of the different emissions regulations: standards, carbon tax, CO₂ markets
▪ Learn how CO₂ emissions regulations specifically impact the activities of an Oil & Gas company
▪ Get an overview of different renewable technologies used in power and transport sectors and their main financing tools
▪ Get an overview of different energy efficiency measures and EE specific financing mechanisms

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturer</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>Introduction to climate change &amp; CO₂ economics</td>
<td>Researcher S. LAMBERT-LALITTE Industry Expert</td>
<td>IFP Energies nouvelles IFP School Total</td>
<td>9</td>
<td>Summer</td>
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<tr>
<td>Renewables: Technology overview &amp; Project financing</td>
<td>Researcher Industry Expert</td>
<td>Imperial College of London Consultant</td>
<td>9</td>
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<tr>
<td>CO₂ Economics &amp; Market</td>
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<td>Johns Hopkins (Nanjing)</td>
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<td>Energy Efficiency Finance &amp; Policy</td>
<td>S. LAMBERT-LALITTE</td>
<td>IFP School</td>
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<td>Carbon Capture and Storage</td>
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<td>CSR &amp; Crisis Management</td>
<td>Industry Expert</td>
<td>Consultant</td>
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TOTAL HOURS IN CLASS: 47 h

▪ Lectures: 42h
▪ Visit: ½ day
▪ Exam: 2h

TRAINING TECHNIQUES

Lectures given by academics and industrial experts.
Case studies.

TEXTBOOK

IFP School Handouts.

GRADING CRITERIA 7C

▪ Final Exam: 70% of the grade.
▪ Case Study: 30% of the grade.
OUTLINE

Climate change: Observations, Sources and Impacts
- Introduction to climate science
- An economic approach to climate change
- Main emitting countries and CO₂ geopolitics

CO₂ Management & Regulation
- The fundamentals of environmental regulation
- International regulation of Greenhouse gases emissions: the Kyoto Protocol
- Standards, CO₂ markets and Carbon Taxes: examples around the world
- CO₂ management in an Oil & Gas company and internal carbon pricing

Introduction to Renewable Technologies
- Renewable sources and technologies: Bioenergy, Solar, Geothermal, Hydropower, Ocean and Wind energy
- Renewable integration into different markets: new energies and new markets
- Expected technological advances and further cost reductions for renewables
- Renewable energy projects financing

Energy Efficiency
- Energy efficiency trends, challenges and potentials
- Measuring energy efficiency and its benefits
- Market failures, Policy options, fiscal incentives
- Financing energy efficiency
- Case studies

Carbon Capture & Storage
- Techno-economics of CCS
- Projects around the world and prospects

BIBLIOGRAPHY
PEM 8

ENERGY MARKETS & TRADING

Coordinators: Arash FARNOOSH; Sidney LAMBERT-LALITTE & Eleanor MORRISON

OBJECTIVES

On completion of the course, students will be able to:

- Identify and analyze the price risk involved in an energy negotiation operation.
- Implement a hedging strategy in accordance with the nature of the risk understand the evolution of a market and the new risks that accompanies it.
- Understand the mechanics and operations of a derivatives exchange.
- Recognize the uses of futures and options for trading and risk management purposes throughout the energy market.
- Get an awareness of the difference between OTC and exchange traded derivatives.

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturer</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
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<td>Oil Trading Fundamentals</td>
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<td>Commodity Reach Consulting</td>
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<td>Summer</td>
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<tr>
<td>Physical Trading &amp; Shipping</td>
<td>Industry Expert</td>
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<tr>
<td>Derivatives &amp; Hedging in the Energy Markets</td>
<td>Consultant</td>
<td>GWA Associates</td>
<td>15</td>
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<tr>
<td>Gas &amp; Power Trading</td>
<td>Industry Expert</td>
<td>Commodity Reach Consulting</td>
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</table>

TOTAL HOURS IN CLASS: 41 h

- Lectures: 39 h
- 1 exam: 2 h

CREDITS US: 2
CREDITS ECTS: 4

TRAINING TECHNIQUES

Lectures given by Experts.
Distant Learning for introductory session
TEXTBOOK

- IFP School Handouts.

GRADING CRITERIA

- **Exam**: 70% of the grade.
- **Case Study**: 30% of the grade.

OUTLINE

**Fundamentals of Market trading**
- Introduction to markets: OTC products, physical vs. cash settlement
- Futures: contango and backwardation

**Oil Markets**
- Introduction to physical oil markets (Oil Benchmarks, price information, price reporting agency)
- Convenience Yield, Basis risk
- Introduction to futures markets (contracts, clearing house, order book)

**Shipping & Physical Trading**
- Shipping and Contract Terminology
- Key players in the shipping market
- Freight derivatives

**Hedging**
- Hedging tools: EFP, options, OTC derivatives
- Applied strategy to oil market
- Sophisticated strategies built on futures and options combinations
- Energy markets risk management

**Gas and Power Exchange**
- Gas & Power trading and hedging specificities
- Dark Spread & Spark Spread

**CO₂ market fundamentals**
- Carbon markets in the world
- Market fundamentals
- Focus: the case of EU-ETS

BIBLIOGRAPHY (A complete bibliography will be given during the 1st course)

PEM 9

PRODUCTION AND RESERVOIR ENGINEERING

Coordinator: Gérard GLOTIN

OBJECTIVES

At the end of the teaching unit, the students are able to:

- Trigger data acquisition, to participate to the treatment and to the interpretation of the data which help first characterize a reservoir.
- Identify the uncertainties attached to these data.
- Understand and estimate the validity of the technical data on which economic analyses are based.
- Evaluate the oil and gas accumulations.
- Identify the drainage mechanisms occurring in a reservoir, to recommend a secondary recovery process, to evaluate the reserves under different options.
- Elaborate development and exploitation scenario with their production profiles, knowing how to evaluate the field initial production potential, to evaluate the number of wells to be drilled, to recommend a secondary process if needed and/or an artificial lift.
- Communicate easily with specialists in this field.

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturers</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
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<td>Production &amp; Reservoir</td>
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<td>IFP Training</td>
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<td>IFP Training</td>
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</table>

TOTAL HOURS IN CLASS: 83 + Field Visit (One day)

- Lectures: 57 h
- 2 test: 6 h
- 1 review: 3 h
- 1 project: 15 h
- Visit: 6 h

CREDITS US: 4
CREDITS ECTS: 8

TRAINING TECHNIQUES

Lectures given by Experts and Projects.
TEXTBOOK


BIBLIOGRAPHY

- “Well Completion and Services”, D.Perrin, Editions Technip.
- “Integrated Reservoir Studies”, L. Cosentino (for advanced).

GRADING CRITERIA

- 2 Tests (no documents): 50% of the grade.
- 1 Project carried out by teams and written reports will be issued; each team will present briefly (3/4 h) the field development project: 50% of the grade.

OUTLINE

- Geology & Geophysics
- Rock properties – Petrophysics
- PVT
- Logging
- Well testing
- Drilling
- Drilling completion
- Production surface facilities
- Primary Recovery
- Secondary Recovery
- EOR
- Reservoir model
- Reserves & field development
- Darling project
REFINING

Coordinator: Carole LE MIRRONET

OBJECTIVES

At the end of the course, the students will be able to:

- describe the main characteristics of various crude oils and petroleum products
- explain the operating principles of refining processes
- analyze the technical impact of more stringent products specifications

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturers</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
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<tr>
<td>Oil refining</td>
<td>Carole LE MIRRONET</td>
<td>IFP Training</td>
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TOTAL HOURS IN CLASS: 33 h

- Lectures: 30 h
- Exam: 3 h
- Refinery visit: 1 day

CREDITS US: 2
CREDITS ECTS: 4

TRAINING TECHNIQUES

Lectures by Experts + Visit of a refinery.

TEXTBOOK

- IFP Training and IFP School Handouts.
- “Petroleum refining for the non-technical person” William L. Leffler, Penwell.
GRADING CRITERIA

- 1 Exam: 100% of the grade.

OUTLINE

Petroleum Products (1 day)
For the main petroleum products (LPG, Gasoline, Jet Fuel, diesel Oil, Heating Oil, Fuel Oil, Lubricants, Bitumen, etc.), the course will develop the main characteristics and specifications, the fields of use, the development of consumption.

Crude Oil Fractionation Units / Distillation (2 days)
- Crude oil fractionation units.
- Crude oil desalting, atmospheric distillation, gas and gasoline separation.
- Vacuum distillation of the atmospheric residue.
- Distillation on dynamic simulator.

Reforming, isomerization, Hydrorefining & Hydrodesulfurization (1.25 days)
- Catalytic reforming and isomerization: integration to catalytic reforming.
- Hydrorefining processes: impurities removal, place of the hydrotreating units in the refining scheme.
- Hydrodesulfurization of intermediate distillates, hydrotreating in new residue conversion schemes, scrubbing treatment (sulfur recovery processes and treatment of residual gases by Claus unit)

Conversion units (1.75 days)
- Conversion unit.
- Outline of conversion and various cracking processes.
- Characteristics and origin of feeds to be cracked.
- Conversion by thermal cracking: visbreaker, various cokers.
- Conversion by catalytic cracking: FCC and related units (alkylation, MBTE, ETBE...).
- Hydroconversion processes: hydrocracker and related units.
- Hydrogen production units.
PEM 11

EFFICIENCY ANALYSIS OF THE INDUSTRIAL FIRMS

Coordinator: Léopold SIMAR

OBJECTIVES

Pre-requisite: Basics in Mathematics, Statistics and Microeconomics.

At the end of the course the students will be able to

- Apply the statistical approaches for measuring and inferring about the economic performances of firms.
- Optimize production functions which represent the upper reachable production from a given set of input.
- Understand various approaches which have been investigated in the literature: stochastic versus deterministic frontiers, parametric and non-parametric models, etc.
- Deal with real case studies dedicated to the analyses of performances in both energy and car industries.

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturers</th>
<th>Company</th>
<th>Hours</th>
<th>Term</th>
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<tbody>
<tr>
<td>Efficiency analysis</td>
<td>Léopold SIMAR</td>
<td>Catholic University of Louvain-la-Neuve</td>
<td>18</td>
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<td>theory</td>
<td>Frédéric LANTZ</td>
<td>IFP School</td>
<td>12</td>
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TOTAL HOURS IN CLASS: 42 h

- Lectures: 18 h
- Applied sessions: 12 h
- Project: 12 h

CREDITS US: 2
CREDITS ECTS: 4

TRAINING TECHNIQUES

Lectures and Applied sessions given by Experts

TEXTBOOK

- IFP School Handouts

BIBLIOGRAPHY

GRADING CRITERIA

- Written report on a case study by groups of 2 students (at home): 50% of the grade.
- Oral presentation with questions: 50% of the grade.

OUTLINE

1. Introduction: production frontier and economic performances of firms.
2. Deterministic and stochastic parametric models.
3. Efficiency measures: application to energy.
5. Sensitivity analysis of economic performances: application to the car industry.
6. Testing productivity changes and tests of return to scale.
PEM 12

DECISION SCIENCES
Coordinator: Peter COWLING

OBJECTIVES
Pre-requisite: Basic in Mathematics (Matrix Algebra). PEM 7A Linear Programming

The objectives of this course are to:
- learn the non-linear programming theory and its application in the energy sector

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturers</th>
<th>Company</th>
<th>Hours</th>
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<tr>
<td>Decision Sciences</td>
<td>Peter COWLING</td>
<td>York University</td>
<td>15</td>
<td>Summer</td>
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TOTAL HOURS IN CLASS: 17 h

- Lecture: 15 h
  (Dynamic & non Linear Programming)
- 1 Exam: 2 h

CREDITS US: 1
CREDITS ECTS: 2

TRAINING TECHNIQUES
Lectures with Applications.

TEXTBOOK
- IFP School Handouts.

BIBLIOGRAPHY
- Dantzig G., Thapa M. (2003), Linear programming, Springer Verlag.

GRADING CRITERIA
- Exam: 100 % of the grade.
OUTLINE

Decision Sciences : (2.5 days + 1 exam : 0.5 day).

- Introduction to dynamic programming
- Introduction to nonlinear programming
- Introduction to MCP problems in their applications in Energy industries (Gas and Electricity)
ADVANCED ECONOMETRICS

Coordinator: Frédéric LANTZ

OBJECTIVES

Pre-requisite: Basic Mathematics (Matrix algebra) and Statistics

By the end of the course the participants will be able to:

- Perform some basic statistical analysis frequently used in both upstream and downstream petroleum industry, marketing, polls, finance, etc.
- Value the applications of statistical and probabilistic concepts in the energy sector
- Use computer-based tools and applications such as Microsoft Excel, Eviews & R
- Build dynamic econometric models in energy economics and finance
- Simulate economic models
- Analyze energy and financial markets through econometric tests.

LECTURERS

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturers</th>
<th>Company</th>
<th>Hours</th>
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<td>Econometrics</td>
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<td>12</td>
<td>Summer</td>
</tr>
<tr>
<td>Advanced Econometrics</td>
<td>Academic</td>
<td>University of Bath</td>
<td>18</td>
<td>Summer</td>
</tr>
</tbody>
</table>

TOTAL HOURS IN CLASS: 42 h

- Lectures: 12 x 3 = 36 h
- 1 Project: 6 h

CREDITS US: 2
CREDITS ECTS: 4

TRAINING TECHNIQUES

Lectures given by Experts. Case-studies.

TEXTBOOK

- IFP School Handouts.

BIBLIOGRAPHY:

SOFTWARE: Eviews, R

GRADING CRITERIA

- Project: 50% of the grade.
- Exam: 50% of the grade.

OUTLINE

Pre-requisite

1. Univariate, Bivariate Descriptive Statistics & Applications
   - Central tendency characteristics of probability distributions: mean, mode, median.
   - Percentiles, box-plot, dispersion characteristics
   - Uses of Index: Laspeyres, Paasche, Purchasing Power Parity
   - Cross tabulation: independence or goodness of fit, introduction to Chi-square statistic.

2. Statistical inference and applications
   - Random variables, expected value and variance.
   - Law of Large Numbers and Central Limit Theorem.
   - Estimators and estimates, quality criterions.
   - Pointwise and confidence interval estimation.

3. Hypotheses testing applications
   - General principles.
   - Parametric Student and Fisher’s tests for equality of means or variances.
   - Chi-square tests for independence and goodness of fit.

Course

1. Introduction to Econometrics and applications
   - Simple (univariate) linear regression model
   - Analytical and geometrical interpretations, R-square goodness of fit criterion
   - Tests upon coefficients and residuals.
   - Basic of forecasting.

2. Advanced Econometrics
   - Introduction to the dynamic process
   - Unit root tests
   - Introduction to cointegration tests
   - Tests for structural breaks (cusum tests)

3. Cointegration between several variables
   - VAR model (Johansen test)
   - Error correction Models
   - Impulse function
   - Analysis of volatility
   - Application to energy and financial markets
3. GRADING CRITERIA FOR PEM PROGRAM

A: Outstanding. The document (exam, case study) details an exemplar achievement, i.e.:
- a relevant analysis of industry-related issues using the skills and techniques detailed in class;
- an appropriate use of relevant sources of information;
- a sound argumentation that demonstrates a real capability to combine modern academic knowledge with industry-relevance (appropriate use of up-to-date references and methodologies).

B+: Excellent. The document demonstrates a superior performance showing sustained excellence in meeting course expectations. In the present case, a B is awarded to a document that details:
- a relevant analysis of industry-related issues using the skills and techniques detailed in class;
- an appropriate use of relevant sources of information.

B-: Good. Above average performance with good knowledge of subject material.

C: Satisfactory. Average and adequate performance, demonstrating a basic understanding of the subject matter and meeting course requirements.

F: Fail. Unsatisfactory performance; course requirements have not been met. A retake is imposed.
4. COURSES IN THE PARTNER UNIVERSITIES
AT COLORADO SCHOOL OF MINES

M.S. in Mineral & Energy Economics

M.S. Prerequisites

Prior to starting the program, students must complete a course in Principles of Microeconomics, a course in Probability and Statistics, and one semester of college-level calculus all three with a grade of B or better. Students will only be allowed to enter the program in the spring if they have completed all three prerequisites as well as undergraduate or graduate course in mathematical economics, and a course in natural resource economics.

M.S. Core Classes

EBGN 509 Mathematical Economics
EBGN 510 Natural Resource Economics
EBGN 511 Microeconomics
EBGN 5102 Macroeconomics
EBGN 525 operations Research Methods
EBGN 590 Econometrics

Areas of Specialization:

List A: Economics – Applied Theory, Empirics, & Policy Analysis
EBGN 530 Energy Economics
EBGN 535 Economics of Metal Industries & Markets
EBGN 541 International Trade
EBGN 570 Environmental Economics
EBGN 611 Advanced Microeconomics
EBGN 690 Advanced Econometrics

List B: Finance (FIN)
EBGN 504 Economic Evaluation & Investment Decision Methods
EBGN 505 Industrial Accounting
EBGN 545 Corporate Finance & Administration
EBGN 546 Investments & Portfolio Management
EBGN 575 Advanced Mineral Asset Valuation

List C: Operations Research/Operations Management (OR/OM)
EBGN 525 operations Research
EBGN 528 Industrial Systems Simulation
EBGN 552 Nonlinear Programming
EBGN 555 Linear Programming
EBGN 556 Network Models
EBGN 557 Integer Programming
EBGN 559 Supply Chain Management
EBGN 560 Decision Analysis
EBGN 561 Stochastic Models in Management Science
EBGN 655 Advanced Linear Programming
EBGN 657 Advanced Integer Programming
EBGN 698 Stochastic Programming
AT GUBKIN UNIVERSITY

(More than 50 % in Russian)

FUNDAMENTALS OF ECONOMICS
Macroeconomics
Microeconomics

TECHNICAL ASPECTS OF OIL AND GAS INDUSTRY
Exploration and Drilling
Production

FUNDAMENTALS OF MATHEMATICS
Statistics and theory of probabilities
Linear Programming
Non-linear Programming

PETROLEUM AND ENERGY ECONOMICS
Petroleum Economics (with a project)
Oil markets
Gas marketing
Management of oil and gas companies
Decision making
AT THE UNIVERSITY OF OKLAHOMA

FULL-TIME MBA PROGRAM STRUCTURE

First Year-Fall

**Prep/Module 1**
Mid August – Mid October
- Quantitative Methods and Modeling (1 hour)
- Managerial Economics (2 hours)
- Financial Accounting (2 hours)
- Organization Behavior (2 hours)
7 Hours

**Module 2**
Mid October – Mid December
- Quantitative Methods and Modeling II (2 hours)
- Financial Markets and Securities (2 hours)
- Management Information Systems (2 hours)
- Introduction to Energy (2 hours)
8 Hours

Second Year-Fall

**Module 6**
Mid August – Mid October
- Business Ethics / Legal (2 hours)
- Negotiation & Leadership (2 hours)
- Elective (2 hours)
- Elective (2 hours)
8 Hours

**Module 7**
Mid October – Mid December
- Strategic Management (2 hours)
- Elective (2 hours)
- Elective (2 hours)
- Elective (2 hours)
8 Hours
### Elective Choices

<table>
<thead>
<tr>
<th>Accounting Electives</th>
<th>Business Administration Electives</th>
<th>Entrepreneurship Electives</th>
<th>Finance Electives</th>
<th>Management Information System Electives</th>
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<tbody>
<tr>
<td>ACCT 5113* Advanced Accounting</td>
<td>BAD 5142 Introduction to Energy</td>
<td>ENT 5902 Entrepreneurial Process</td>
<td>FIN 5202 Energy Advanced Corporate Finance</td>
<td>MIS 5612 Database Design &amp; Administration</td>
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<tr>
<td>ACCT 5352 Financial Statement Analysis</td>
<td>BAD 5152 Energy Accounting &amp; Regulation</td>
<td>ENT 5912 Entrepreneurial Finance</td>
<td>FIN 5322 Derivative Securities &amp; Markets</td>
<td>MIS 5622 System Analysis &amp; Design</td>
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<tr>
<td>ACCT 5553 Fraud Examination</td>
<td>BAD 5480 Sales Management</td>
<td>ENT 5931 Strategic Venture Development I</td>
<td>FIN 5342 Advanced Corporate Finance</td>
<td>MIS 5652 Knowledge Management</td>
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<td>ENT 5942 Market Development</td>
<td>FIN 5362 Fixed Income Fund Management</td>
<td>MIS 5682 Business Data Administration</td>
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<td></td>
<td>FIN 5162 Energy Assets &amp; Commodities</td>
<td>MIS 5782 Advanced Database Management</td>
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<td>FIN 5613* Student Investment Fund</td>
<td>Systems Design &amp; Implementation</td>
</tr>
</tbody>
</table>

All courses subject to pre-requisite requirements prior to enrollment

*Requires special permission prior to enrollment
## AT TEXAS A&M UNIVERSITY

### WATERFLOODING

Design, surveillance and project management of waterfloods in reservoirs.

### PETROLEUM DEVELOPMENT STRATEGY

Applications of variables, models, and decision criteria used in modern petroleum development. The case approach will be used to study major projects such as offshore development and assisted recovery. Both commercial and student-prepared computer software are used during lab sessions to practice methods.

### PETROLEUM RESERVOIR DESCRIPTION (Technical requirement)

Engineering and geological evaluation techniques to define the extent and internal character of a petroleum reservoir; estimate depositional environments during the formation of the sedimentary section and resulting effects on reservoir character.

### FLUID FLOW IN PETROLEUM RESERVOIRS (Technical requirement)

Analysis of fluid flow in bounded and unbounded reservoirs, wellbore storage, phase redistribution, finite and infinite conductivity fractures; dual-porosity systems, gas wells.

### ADVANCED RESERVOIR ENGINEERING

Petroleum reservoir simulation basics including solution techniques for explicit problems. **Group Project**: Translation of a simulation software in Visual Basic.

### ENHANCED OIL RECOVERY METHODS (Thermal)

Fundamentals of enhanced oil recovery methods and applications of thermal recovery methods.

### EXPLORATION AND PRODUCTION EVALUATION

Selected topics in oil industry economic evaluation including offshore bidding, project ranking and selection, capital budgeting, long-term oil and gas field development projects and incremental analysis for assisted recovery and acceleration.

### STATISTICAL ANALYSIS

Introduction to probability, probability distributions, and statistical inference; hypotheses testing using t and F test; introduction to methods of analysis such as tests of independence, simple regression, analysis of variance with some consideration of planned experimentation.

### SURVEY OF MANAGEMENT

The course provides an understanding of how a corporate strategy is implemented and how different areas, such as research, production, financing, marketing, etc. are involved.
Management concepts and applications important to managers in all types and sizes of organization; includes: strategic planning, goal setting, control, and managerial ethics; decision making, organizing, human resource management, including staffing, performance appraisal, and compensation; leadership, motivation, communication and group processes; achieving organizational quality and managing in a global environment.

**Research Paper:** Women in Management (example).

**SURVEY OF MARKETING**

The course provides an introduction to different aspects of markets and marketing methods. The material focuses on the main concept involved in a firm’s commercial activity and includes market analysis and sales strategy.

**REGIONAL INTEGRATION IN THE AMERICAS**

Examination of theory and application of regional economic, political and social integration, North American integration from the perspective of NAFTA members; role of multinational enterprises; topics pertaining to the negotiation, impact and extension of NAFTA.

**INTERNATIONAL MANAGEMENT**

Survey of the issues, problems, challenges, and opportunities facing organizations competing in a global economy; includes: the environment of international management, international strategies, forms of organization design used by multinational firms, managing human resources in an international context, and cultural and control issues facing the international manager.

**SENIOR PROJECT**

1st semester: Design of the ring thruster, an innovative propeller with no central shaft created by Harbor Branch Oceanographic Inc. The objective is to design a propeller, which can be easily modified to test different settings, within technical and budget restrictions.

2nd semester: Realization of the project.

**MARINE FIELD PROJECT**

One week on board the “Delphinus” in Marathon, F1. Objective: collect oceanographic data (biological, chemical, physical, and geological) as a part of a government project to map the channel off Marathon Island. Operating major oceanographic devices including rigging underwater. Writing a report including all data collected as a group project.
AT OTHER PARTNER INSTITUTIONS

AUDENCIA
BI NORWEGIAN BUSINESS SCHOOL
CHINA UNIVERSITY OF PETROLEUM AT BEIJING
ESCP EUROPE
ESSEC
UNIVERSITY OF ALBERTA
UNIVERSITY OF DUNDEE
UNIVERSITY OF SAO PAULO

When attending the Fall Term in the chosen partner institution, students are allowed to choose between all the graduate level courses available to them (core and elective courses) according to their professional/academic projects.

Student must refer to the partner institution’s course catalogues to select their courses.
PERSONAL NOTES
PERSONAL NOTES